THE IRON AGE

New York, January 29, 1931

ESTABLISHED 1855

VOL. 127, No. 5

Thomas B. Frank

DEPRECIATION—

A Direct Cost

THOMAS B. FRANK, who is the author of the accompanying article, is an authority on cost accounting. Since 1922, he has been treasurer of the Cincinnati Planer Co., and is also treasurer of the Cincinnati Automatic Machine Co., and auditor of the Greaves-Klusman Tool Co.

Mr. Frank has been active in the work of the National Association of Cost Accountants, and a director of that organization for the past three years. He has made a special study of the subject of depreciation and is preparing a book on that subject.

BETWEEN the time when physical property is acquired and the time when it is no longer economically useful, there occurs a diminution in value commonly called "depreciation." Probably the most comprehensive definition of the term is, "the financial effect of wear and tear and obsolescence." It is a hazard of business that is not generally given the same careful consideration as other business contingencies. It is looked upon by many as one of the incidental rather than one of the major factors to consider and account for.

Depreciation Is an Element of Cost

The commonly used and best understood application of depreciation is the periodic charge off of so many dollars on the books of account for the sake of conservatism. The real problem to be considered is the setting of adequate rates consistently and scientifically determined as applied to a proper basis of valuation, and adoption of a consistent policy of accounting that will assure continuance of the plant properties.

The financial effect of wear, tear and obsolescence is an element of cost the same as labor and material costs. It is unfortunate that depreciation, which is really a direct cost, should always be classified as an item of overhead. So many property dollars are used up in wear and tear every time a part of a plant's product is manufactured. Surely this is a direct cost of using the property for the purposes of production. It would be far better to consider that cost as a direct or prime cost, which must be recovered the same as the cost of labor and material. It is the actual cost of the consumption of property. Unless such costs are actually included in cost figures at all times, they become losses that are not compensated for in the regular course of business. This cost is always present whether or not it is shown in cost figures or on books of account.

All costs must be recovered with a profit if a busi-

TABLE I

Mach. No.	Normal Hours	Cost of Acquisition	Annual Dep'n	Rate per Hour	Present-Day Values	Annual Dep'n	Rate per Hour	Increase or Reduction
1	1560	$16,530.00	$1,653.00	$1.06	$33,849.38	$3,384.94	$2.17	$1.11
2	1560	16,053.00	1,605.30	1.03	23,560.04	2,356.00	1.51	0.48
3	1560	2,368.00	236.80	0.15	4,871.62	487.16	0.31	0.16
4	1560	2,593.00	259.30	0.17	4,141.50	414.15	0.27	0.10
5	1560	4,798.25	479.83	0.31	7,638.51	763.85	0.49	0.18

ness is to prosper and continue. Depreciation or the gradual decline in value and wearing out of property is a cost that must be recouped. Without such a cost included as a part of total cost how can assurance be had that a sufficient sum is being recovered through selling prices to protect the business? If this is not done eventual failure will result. The charging of a sufficient amount for depreciation into costs, and based on present-day values of the properties, provides a reserve sufficient to meet actual replacement requirements, as the reserve will fluctuate in accordance with market prices of the facilities being used. It is a serious matter for the manager to find that at the end of the useful life of a machine costing $16,530 before the war his reserve is inadequate to purchase another like machine, the present-day cost of which is $33,849.38.

Depreciation when omitted from cost figures creates the tendency to underestimate selling prices. If competitive conditions exist the omission becomes serious. It may cause underbidding and other unethical trade practices. If fairly good prices are obtained, a fictitious profit exists, which is usually dissipated in the form of dividends, unwarranted expansion, salaries, etc., instead of being used for the financing of replacements.

There are some business men, and accountants too, who look upon depreciation as a financial loss instead of as a cost, such losses to be replaced from surplus, which, otherwise, if proper accounting methods had been used, would be available for dividends. This is in effect financing replacements from additional capital. The idea is erroneous and the result of insufficient information. Grant for a moment that such a conception be accepted, what investor would put additional funds into a business that had not made provision through its accounts for a continuance of the business and the replacement of property used up in the operations of that business? Business is expected to be self-perpetuating out of funds created by adequate profits after all elements of cost are recompensed. Stockholders expect ample protection of their investment and the capital they have furnished must be unimpaired. Proper depreciation accounting will assure no impairment from that source. Modern progress in invention makes this more important than ever before.

Today there is a more rapid turnover of plant equipment, the adoption of newer processes, and other changes of a radical nature. This development must be reflected in depreciation charges to cost, for, if they are not, costs cannot be correct. Present-day conditions demand that proper rates for depreciation be used. In former years a flat 10 per cent rate applied to an entire plant was deemed to be adequate. Recently it has been found practicable to determine

TABLE II

A	B	C	D	E
Cost of Acquisition	Depn. @ 10 Per Cent	Present-Day Values	Depn. @ 10 Per Cent	Increase or Decrease (x)
Post-War Case				
$16,530.00	$1,653.00	$33,849.38	$3,384.94	$1,731.94
17,000.00	1,700.00	33,849.38	3,384.94	315.06(x)
$33,530.00	$3,353.00	$67,698.76	$6,769.88	$1,416.88

TABLE III—STATEMENT OF PROFIT AND LOSS

INCOME		
Sales—net		$25,000.00
COSTS		
Manufacturing	$18,000.00	
Marketing	2,000.00	20,000.00
Profit on sales		$ 5,000.00
INCOME ADJUSTMENTS		
Depreciation—excess over cost basis	$1,731.94	
Decrease from cost basis	315.06	1,416.88
Net profit		$ 6,416.88

separate rates for each class of property. For example, 15 years ago 5 per cent was considered sufficient for machine tools. Today the average machine tool becomes obsolete in even less than 10 years, to say nothing of the actual wear and tear. A 10 per cent rate is hardly adequate for that class of equipment. Each industry has its own problems and the managers and their accountants must study conditions that affect their particular industry very carefully when setting their rates.

Current Values Must Determine Depreciation Costs

Of the many methods used for computing depreciation there can be only one correct method that is at once logical and sensible. That method should base its computation on present-day values of the equipment at current prices prevailing in today's markets. To succeed modern business must be controlled by modern methods based on current information. Surely facts pertaining to the present time are vitally necessary to accomplish this result and are much more valuable than purely historical records.

Cost figures including depreciation based on costs of acquisition, or values other than present-day values, cannot tell the manager anything more than what would have been true at some other time. Historical facts have their purpose, but current facts are required by modern business.

Many properties in existence today were acquired over a period of years, some before the war at low prices, some during the war or immediately after at peak prices, while others were acquired during recent months when prices were on still a different level. Truly comparable costs cannot be computed and intelligent executive decisions made unless a proper median be determined as a basis for plant valuation and depreciation charges. The answer is to use present-day costs of plant properties.

From the viewpoint of production costs, depreciation is very important. The basis of its computation is even more important, as will be shown by the figures in Table I. The figures are actual examples taken from the books of a machine tool plant. The normal productive time expected from each machine is 1560 hr. annually. This indicates that the depreciation element of overhead alone amounts to $1.06 per hour on machine No. 1, based on cost of acquisition. The same hourly rate is $2.17 when based on present-day values, which is an increase of $1.11 per hour. No manager can possibly sit by and refuse to consider proper depreciation of his plant when the hourly effect on his costs amounts to such proportions. Even on smaller machines such as Nos. 3 and 4 the difference in depreciation between the two bases amounts to 16c. and 10c. respectively. Cost figures based on present-day values, rather than on cost of acquisition, show costs of production to be considerably higher than they appeared on many cost sheets. If these facts were laid before managers, many would soon realize that their total present-day costs are materially higher than they now suspect. It would be a poor manager who would not make every effort to protect his stockholders' capital from impairment. It is far safer to provide for such conditions by anticipating them, through cost figures based on present-day calculations of value. In addition, adequate and correct depreciation charges to costs of production, assuming all other burden charges to be complete and correct, will furnish management with a true and accurate guide as to the progress being made by the business.

Economic law cannot be changed. Current consumption of value is at current prices and nothing else. Books of account should so record it. Complacent contentment with old forms of accounting that do not consider economics will not alter the effect of economic laws.

EVERY time that any part of a plant's product is manufactured, property dollars are being used up in wear and tear. This is actually a part of the real cost of the product, but unfortunately, custom and convenience have made it a part of overhead expense.

What investor would put additional funds in a business that had not made provision, through its accounts, for the replacement of property or materials used up in operations? This is virtually what happens when depreciation is considered as a loss to be replaced from surplus.

Another common error is to base depreciation on first cost of plant or equipment. It is a serious matter for the manager to find that at the end of its useful life, the replacement of a machine bought in pre-war days will cost double the amount reserved for its replacement.

Mr. Frank, in this article, takes a common-sense view of depreciation that will interest all responsible executives.

Reconciling Proper Depreciation Accounting with Income Tax Procedure

Certain records must be kept on the basis of original cost of acquisition for income tax purposes, but that fact does not preclude the computation of costs based on current values for the use of the company's executives. There is no apparent obstacle of any importance that will

(Concluded on page 414)

The Continuous Enameling of Refrigerator Parts

By A. W. LEVIE

SEVENTEEN electric furnaces are operated by the General Electric Co. for firing vitreous enameled refrigerator parts. Five of these are of the box type, three of which are in the Schenectady plant and two in the Erie plant.

These furnaces are used for firing the dipped ground coat and the two sprayed finish coats of enamel on the large-size refrigerator cabinet liners and door liners. The work is placed on motor-operated charging forks which carry it into the furnace and place it on points for burning.

Twelve continuous, overhead conveyor-type furnaces are used for firing enameled refrigerator parts. Two are located in the Fort Wayne, Ind., plant, two are at the Erie, Pa., plant, one is in the Lynn, Mass., plant and seven are at Schenectady.

The seven continuous furnaces at Schenectady are all located in one room, as shown in the diagram. Four are located side by side in one end of the room. The conveyor for each extends straight out from the open end of the furnace, 30 ft. toward the center of the room. The other three are located in a similar manner in the opposite end of the room, with their conveyors extending 30 ft. out toward the center.

Running across the center of the room and between the two batteries of furnaces is an overhead conveyor which brings the parts into the room to be enameled and takes the finished work away to the storage or assembly room.

Five of the furnaces are used for firing refrigerator evaporators, one is for water cooler evaporators and one is for flat ware such as the bottom plates of cabinet tops.

After the evaporators have been annealed and inspected, they enter the enameling room on a roller-table conveyor, from which they are removed and hung on the conveyor which passes through the center of the room. This conveyor carries them to the sand blast, which is located just outside the building. After sand blasting, the parts are hung back on the conveyor and are brought back into the opposite corner of the enameling room along the wall and over inspection tables, where they are removed, inspected and again hung on the conveyor and carried on to a preparation table, where they are removed and prepared for the ground coat of enamel.

The evaporators to which three coats of enamel are applied are fired in furnace

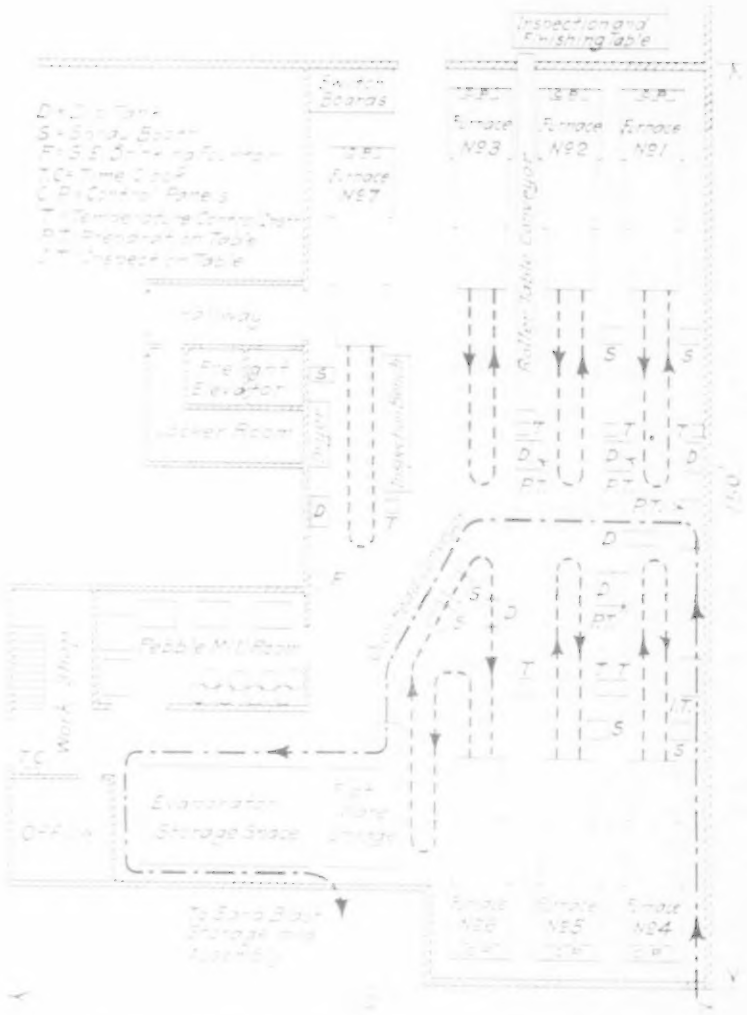


Fig. 2—Diagram of enameling room, showing seven inclined heat-sealed U-type conveyor furnaces 28 ft. long for firing vitreous enameled refrigerator parts in plant of General Electric Co., Schenectady, N. Y. Each has two control zones.

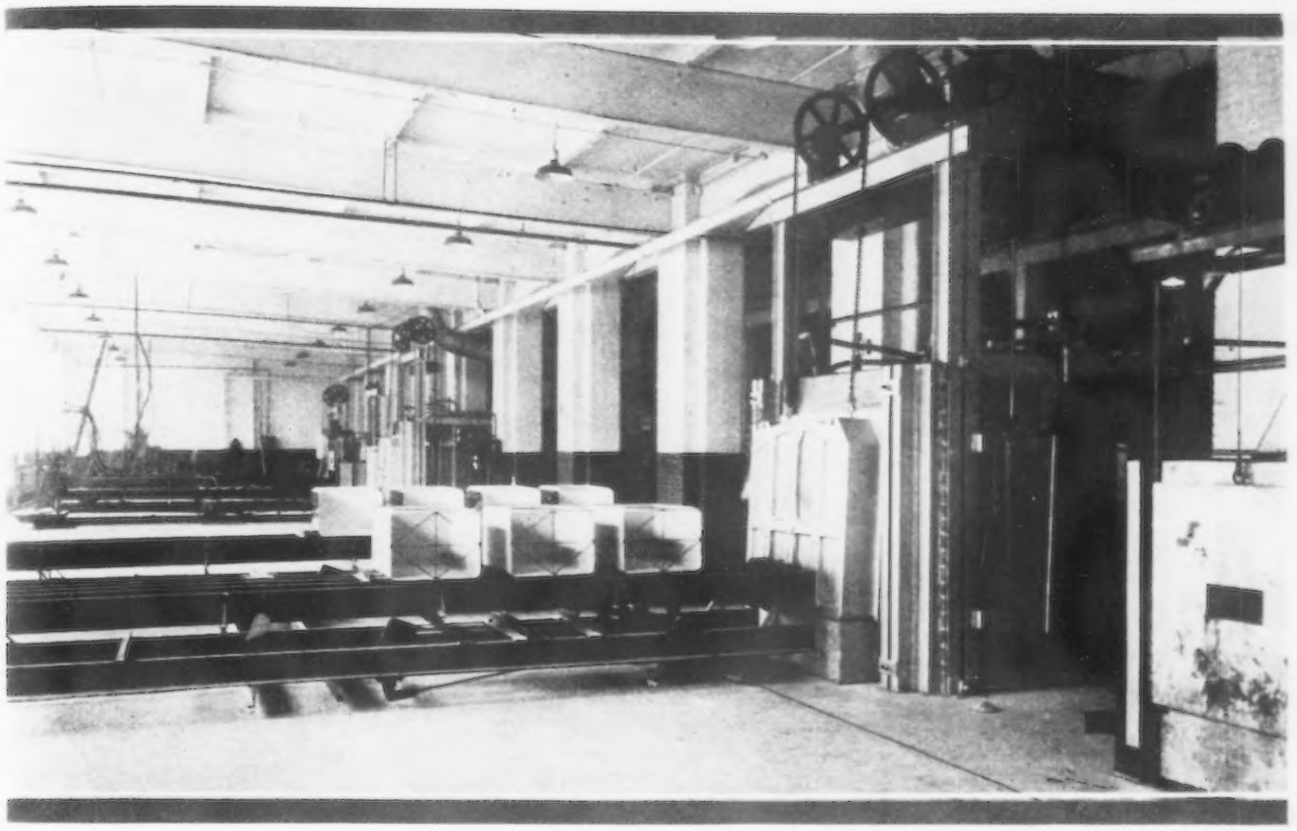


Fig. 1—Battery of three batch-type electric vitreous enameling furnaces with charging forks for enameling large-size refrigerator cabinets. Each furnace is 4 ft. x 12 ft. inside and rated 260 kw., 220 volts, three phase.

Nos. 1, 2 and 3. Furnace No. 1 is used for firing ground coat, No. 2 fires the first finish coat and No. 3 fires the finish. Furnaces No. 4 and No. 5 are used for firing parts which receive two coats, one ground and one gray. The ground coat is fired in furnace No. 4 and the gray coat in furnace No. 5. Furnace No. 6 is used for firing three-coat flat ware. Furnace No. 7 fires all three coats which are applied to the water cooler evaporators.

All evaporators are dipped for both ground and finish coats, while the flat work is dipped for ground coat and sprayed for the two finish coats. After each coat of enamel has been fired, the piece is passed over to the next furnace and so on until final inspection of the finished piece is made. Upon passing inspection, the finished pieces are again hung on the conveyor which passes through the center of the room and is carried on to storage or to the assembly room on the floor above.

Each furnace produces from 40 to 60 single-coat evaporators an hour, depending on the size being run.

With the enameling room laid out so that a conveyer brings the work into one side of the room, and with each furnace operation progressing it across the room, many steps are saved, racks and trucks for hauling the work from one operation to another are almost entirely eliminated, floor space is saved and spoilage due to handling is cut to a minimum.

These continuous furnaces were built by the General Electric Co. and are its standard air seal design. The firing chamber is elevated so that its floor is at

THE "finish" given to metal products plays an important part in arousing the desire to possess which is such a large part in building consumer demand. Especially is this true when the product is one for domestic use. Here the eye-appeal is a powerful sales factor.

This article describes the continuous enameling of refrigerator parts as practiced by the General Electric Co. The methods and apparatus described are applicable to a large number of other products.

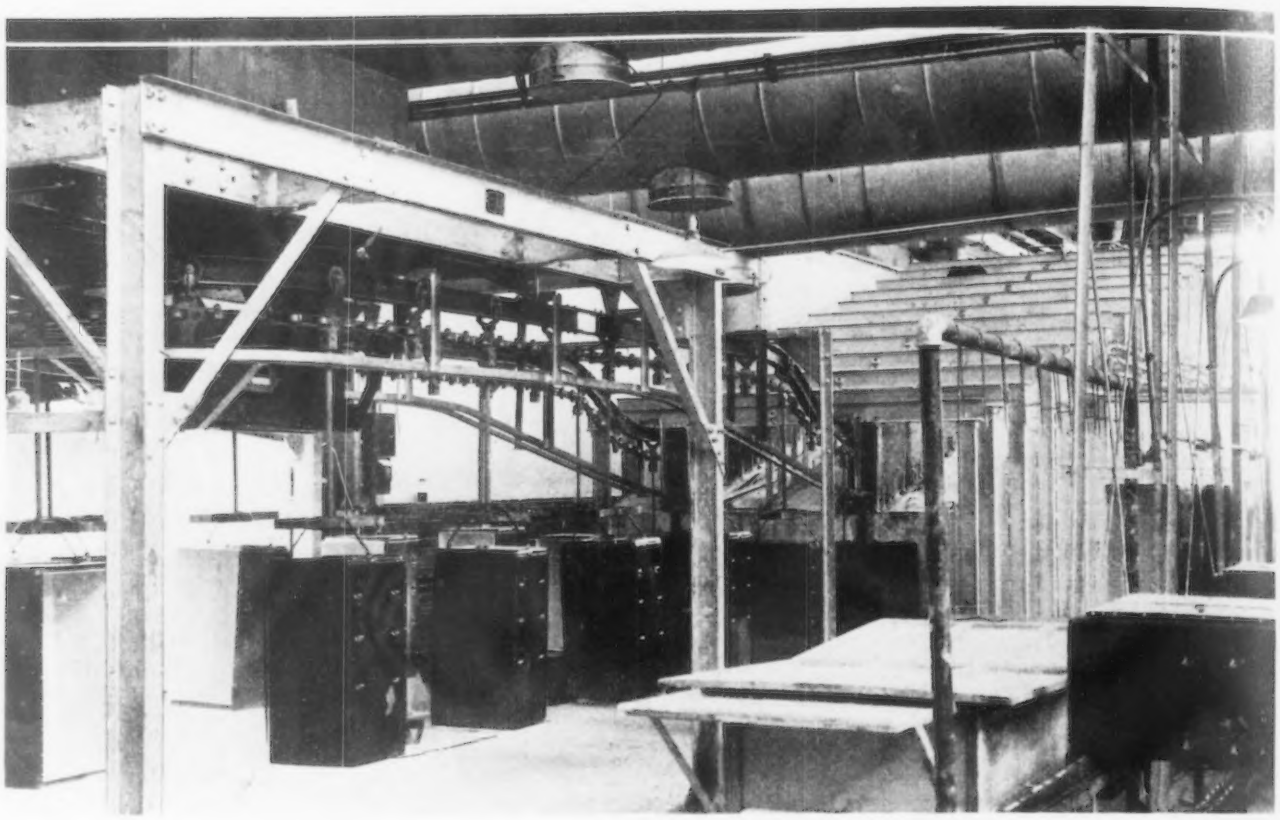
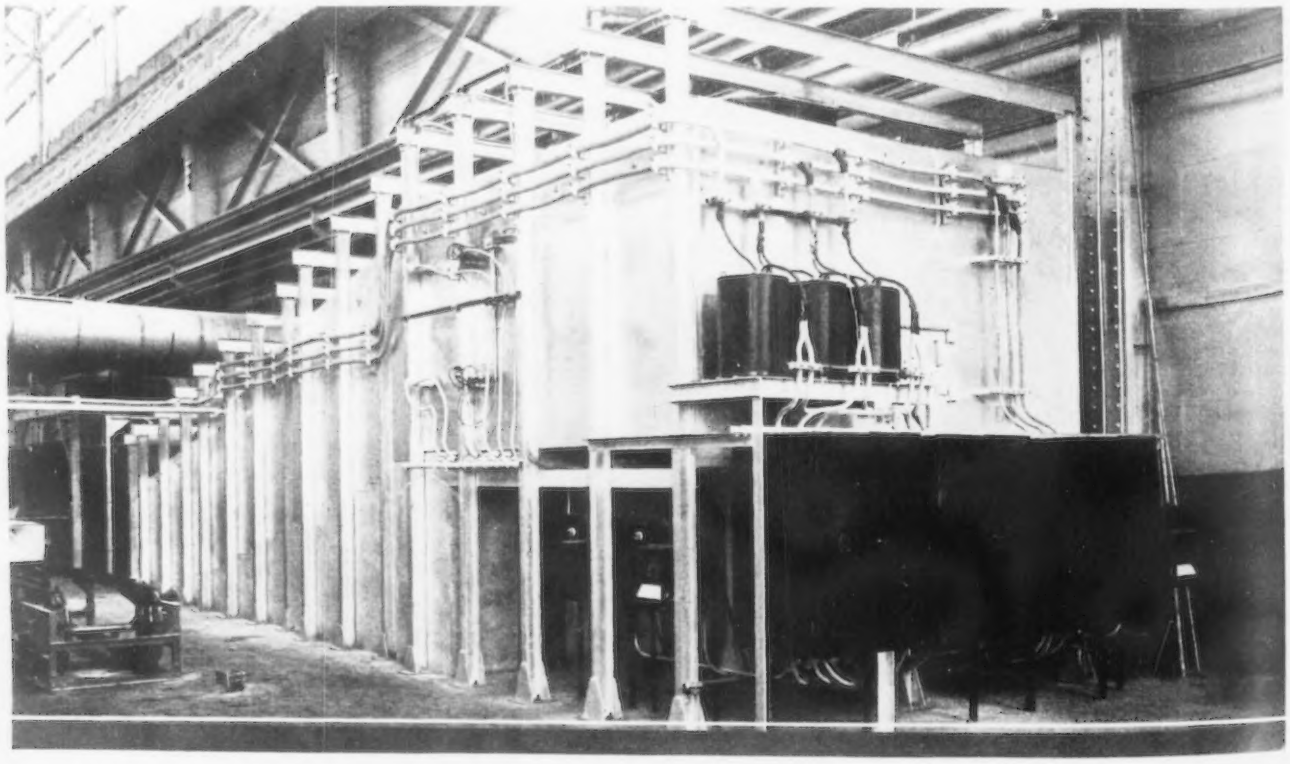


Fig. 4—Inclined, heat-sealed, U-type conveyor furnace 43 ft. long with control zones. Used for firing vitreous enameled refrigerator cabinets in Erie, Pa., works of General Electric Co. View shows wet work entering left side and fired work leaving right side.

Fig. 5—View of elevated heating-chamber end of 400 kw. inclined, heat-sealed, U-type conveyor furnace for enameling refrigerator cabinets.



a level above the entrance or exit doors of the furnace, thereby trapping the heat in the elevated end. Every 32 in. along the overhead conveyor of each furnace is suspended a vertical hanger rod, which carries a rack on which the work to be fired is placed. The conveyor passes along over the furnace and through a hood, which is made air tight to prevent heat losses. The hanger rods which carry the racks and work extend from the conveyor down through a slot in the roof of the furnace. As the work passes into the open door, up the inclined preheating chamber to the horizontal firing chamber, the conveyor makes a U turn on a 38¼-in. diameter circle and returns to the front end, down the incline and out. The ingoing and outgoing conveyors are 38¼ in. between centers and travel in opposite directions, so that there is a maximum transfer of heat from the hot outgoing to the cold incoming work.

The inside length of each of these furnaces is approximately 28 ft. The inclined preheating section is 20 ft. and the firing section 8 ft. The heating units are made from a nickel-chromium alloy ribbon, formed into loops and hung on the side walls of the firing chamber. The center wall of the firing chamber consists of 9 in. of fire brick and the outer walls are 9 in. of fire brick and 13 in. of Sil-O-Cel insulation. The roof consists of 4 in. of fire clay tile and 13½ in. of Sil-O-Cel insulation.

For the evaporator furnaces the conveyors travel from 14 to 16 in. per min. and for the sheet ware furnace the speed is about 4 ft. per min. Each conveyor has a counterweighted automatic take-up so that, if the conveyor chain should stick or bind, the take-up will operate to shut off the power.

Each furnace has two central zones. One is on the ingoing side of the firing chamber and one is on the outgoing side. The temperature control instruments are located out by the dip tanks so that the operators may readily adjust the furnace temperature to suit the production. The automatic control panels of each furnace are placed under the back end of the elevated firing chamber in order to save floor space.

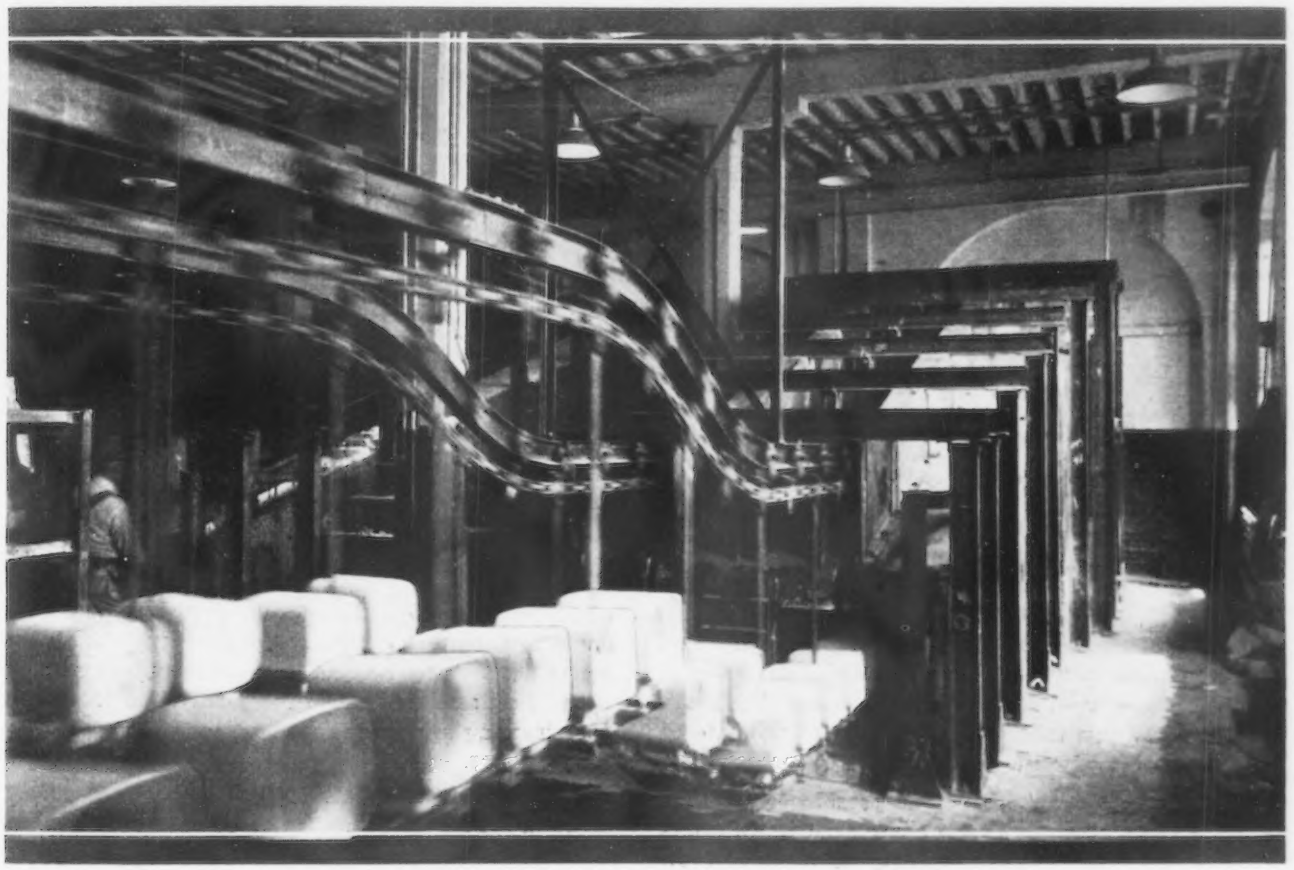


Fig. 3—Inclined, heat-sealed, U-type conveyor furnace for firing refrigerator evaporators. Furnace is 28 ft. long and fires from 41 to 56 enameled evaporators an hour.

Two operators are required for each of the evaporator furnaces. One man dips the work, drains it and places it on the ingoing conveyor and the other man removes the fired work from the conveyor, inspects it, prepares it for the next dipping and passes it to the operator of the next furnace. On the sheet ware furnace, both operators remove the work from the conveyor, spray and rehang it as the conveyor moves through the spray booth. The operation of this enameling room is continuous six days and nights a week, with three shifts per day.

The majority of the small-size cabinet liners for household refrigerators are enameled at the Erie plant of the General Electric Co. These cabinet liners all receive three coats of enamel. The ground coat is

(Concluded on page 401)

Steel and Concrete in Early Residential Construction

FORTY years ago Niels Poulson, of the Hecla Iron Works, built this house for his own home. It was framed entirely of steel, the floors were concrete and steel, the exterior was clad with copper sheets and the roof was of vitrified clay shingles.

By GEORGE G. WHEAT

NIELS POULSON was an early leader in advancing the use of steel and iron construction and he visioned the future cities of America built largely of steel frame and equipment. His house embodied his own most advanced ideas of the date of 1890 when it was built.

The house was not small. Dimensions were 43 x 60 ft. for the main three-story part and to this was added a 21-ft. square kitchen in the rear and a 23-ft. diameter octagonal-shaped conservatory, both one-story in height. The only portion using wood framing was the third or roof story which used heavy wood rafters, studs and roof sheathing. In this story the plaster base was reinforced woven wire cloth and all door openings and windows were well built, with brick and tile firestopping.

The frames of all walls, both outside and partitions, were of angle bars. The studs were $\frac{1}{2}$ x 4 in., weighing about 12 lb. per lineal foot. The horizontal members were the same size for the base line and at each floor level. Those at top and bottom line of windows were $\frac{3}{8}$ x 3 in. The top line was a 4-in. T-bar. Upon this was fastened a wood member and the roof structure. The angles fitted over the corners of the walls and made a complete steel frame around each window. At all crossings bolt fastenings were used, the bolts being flat-head, slotted and countersunk. When this frame was firmly bolted it was rigid, and when the floor framing was placed it was perfectly stiff and withstood the shock of sledging out the floors of concrete and battering out the walls of brick during demolition. Some I-beams were used in floor support where long stretches called for subdivision to suit the floor framing method.

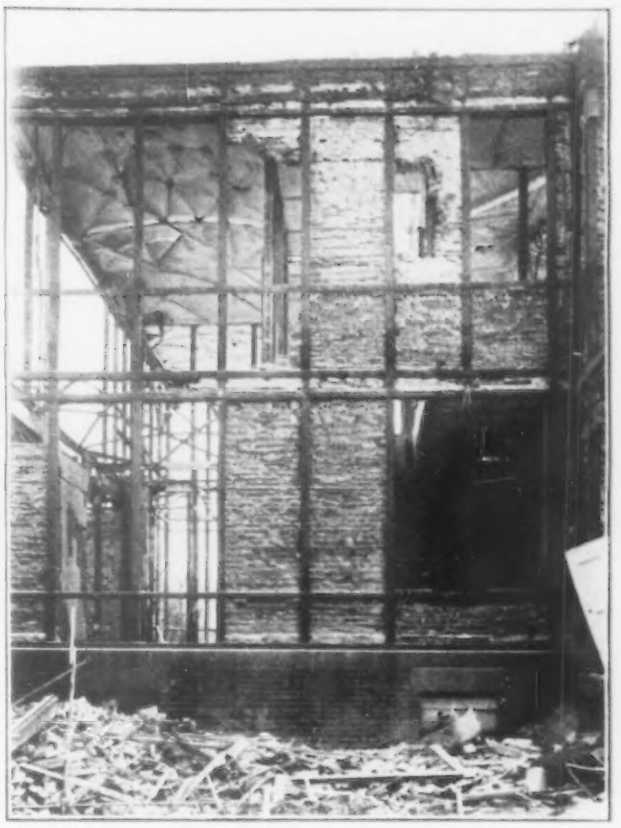
In Fig. 4 is shown the method of floor frame construction, using flat bars in star pattern, sprung to form an arch. Upon this frame was placed a webbing of concrete of the same pattern as the flat bars and directly upon them, each web of concrete being the width of the bar under it. The depth of concrete was greater at the sides of the room and thinner at the center thus bringing the final concrete webwork to a level. Upon this leveled web was then set a form made with wood furring strips to which heavy galvanized wire cloth was stapled. Into this form was troweled concrete mortar of a consistency which did not run through but did set well into the wire cloth.

The completed floor was made by setting a rough pine floor by nailing to the furring strip edges. A finished floor of hardwood completed it.

When the steel frame was all set, sheets of copper were paneled to fit exactly into the shapes made by the steel frame. This copper was ornamental in design and was made by the "galvano-plastic process" of deposition of copper out of battery solution and upon wax molds. When this was complete the brickwork was set. In passing it may be observed that this metal exterior sheet covering method, adapted to modern

NIELS POULSON, in 1890, built this steel framed residence in New York City. It was one of the first, if not the first, application of structural steel and concrete to the building of homes, and indeed it was but five years previously that steel framing had been applied to any building.

Recently, this house was demolished, and during the process the details of construction were revealed. So carefully thought out and executed were they that they would stand comparison, favorably, with modern practice.



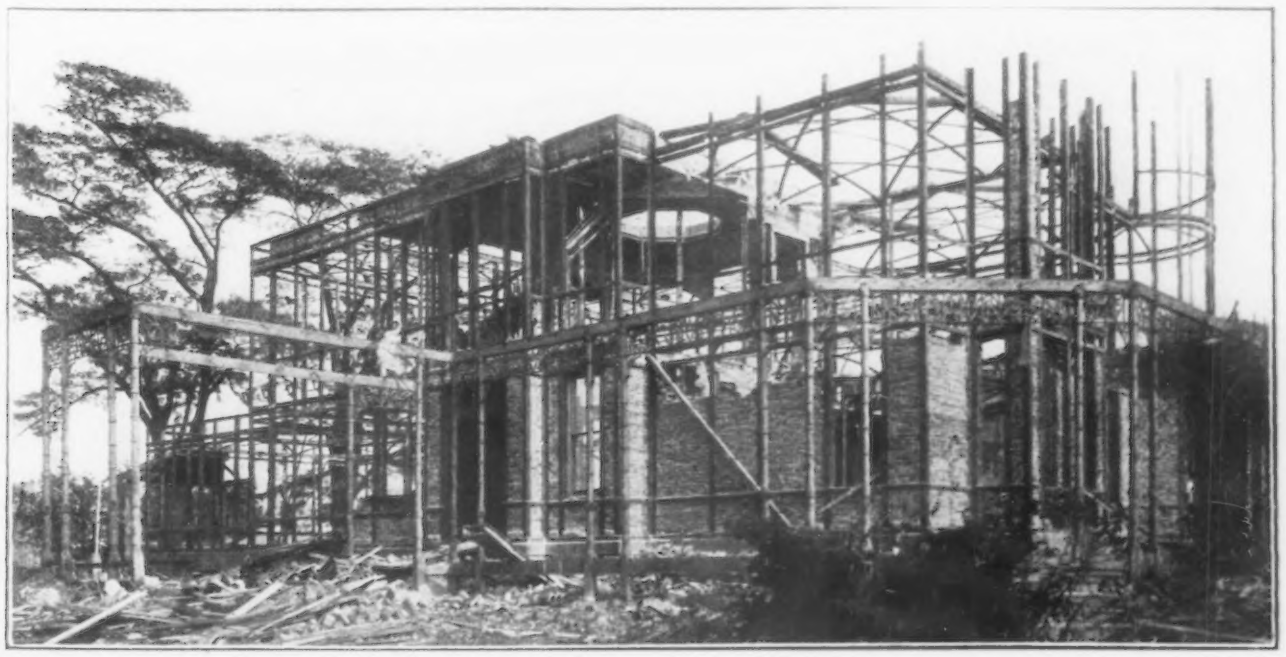
needs, could well be used freely in present day structures.

The plastering was set directly upon this brick work of exterior walls and the tile of partition walls without any lathing or furring, and so no wood entered into the structural walls. This plastering covered the partition steel with a coating of more than 1 in. The correctness of this direct wall use of plaster is shown by the fact that the original wall paper served for the more than 30 years' use of the building as a residence. It was expensive hand-blocked French paper.

The side wall, revealed in Fig. 3, shows the direct resemblance to modern steel and masonry of office structure type. The finished ceiling, at the upper left, shows the exact pattern of the steel frame and was covered with two inches of white gypsum plaster.

FIG. 5.—The close resemblance to modern fireproof building construction is brought out in the photograph (above). Note the arched ceilings in the upper floor to the left.

FIG. 2.—Picture (below), taken during the course of demolition, shows the all steel structural framing and the complete steel floor frames. The only wood is in the top and bottom rails of the porch in the foreground.



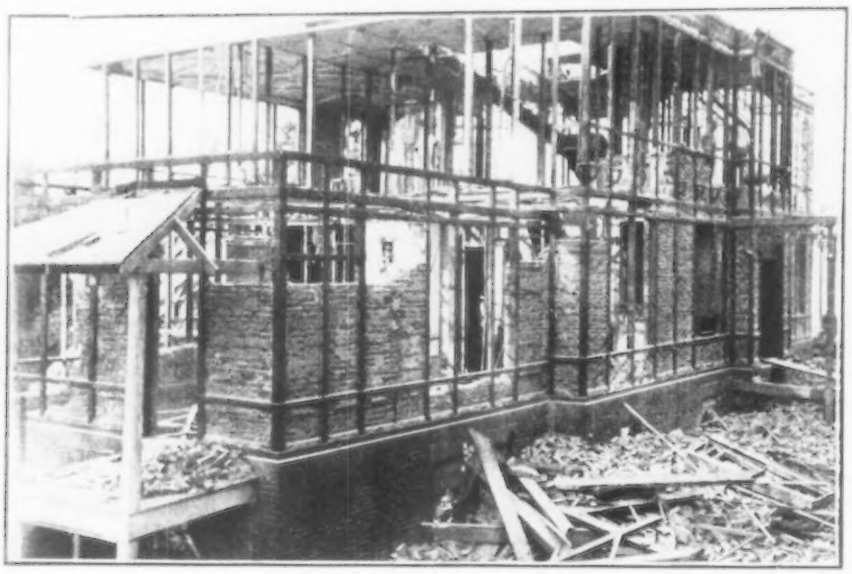


FIG. 3.—The starting point in erecting the building. Each side wall was assembled while lying flat, then the walls were raised and bolted, at the corners (at left).

FIG. 4.—The floor steel and the method of bracing the framing. Diagonals of 3-in. angles across the corners formed a true octagon. Webbing of 1-in. by 4-in. flat bars was next sprung from opposite interior angles, forming an eight-point star with a 14-in. arch at the center (below).

This made a floor ceiling slab that was highly fire resistant and equal to every possible need for safety.

In general it can be said that this early use of steel frame and fireproof dwelling construction was evidence of the practicability of such construction far ahead of its time. The steel was in excellent condition when removed and would have lasted for centuries, as would all the structure. Bolts came away freely with no use of an extra holding wrench. But one steel bar was corroding, and that was the base line bar. The stone water table might have been niched downward to permit the copper sheet to extend below this line and so protect the mortar bed of the steel and the bar itself from weather. Aside from this no criticism of design can be offered.

Some few words of Niels Poulson are due. He was of most humble birth and scanty schooling. Born in Denmark in 1843 and hardworked as a child, he entered apprenticeship as a bricklayer and studied in the technical schools at night. He came to New York at the age of 21 and worked as a bricklayer at first but was laid off as being too slow although very thorough. He became a draftsman and secured a position with the Treasury Department in the architectural division.

Conceiving the future for steel and iron in construction as he viewed the increase in building heights, he resigned and came to New York, where he worked as draftsman in a structural iron works office. This concern failed but Niels Poulson joined with a Norwegian friend of similar schooling and entered the business with a few hundreds of dollars capital. Inside of eight years they were employing 1000 men. They conducted night schools to train their workmen; they had European artists and sculptors as designers and employed chemists for their foundry work.

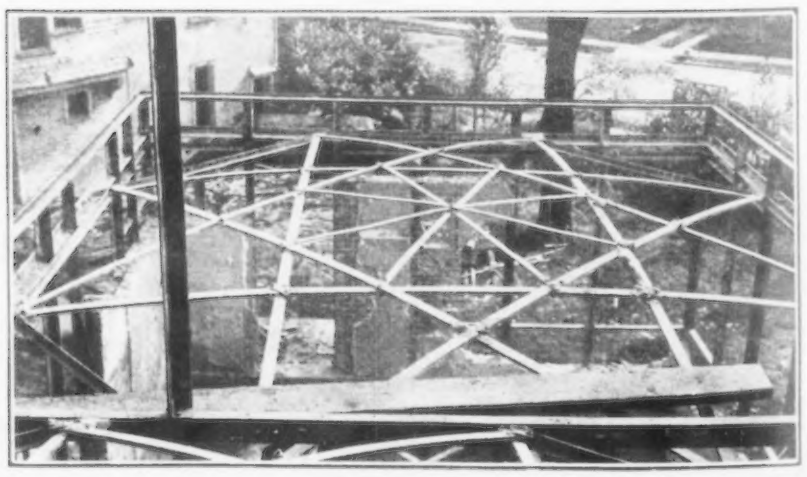
Niels Poulson's house embodied his conception of a future type suitable for dwelling construction and was largely made in his works.

Mr. Poulson became a millionaire well before 1910. He left his fortune to found the American-Scandinavian Foundation, one of the early organizations created to promote international friendship and peace.

Embrittlement in Boilers

Bulletin 216 of the Engineering Experiment Station, University of Illinois, Urbana, deals with the embrittlement of steel in boilers as a cause of cracking in the riveted areas, which progresses from rivet hole to rivet hole and frequently is unseen until the condition is most dangerous. Such embrittlement is traced to boilers using water of certain deleterious characteristics. Investigation has resulted in the publication of a bulletin of 125 pages, in which the whole field has been surveyed in great detail. About 30 pages of the paper are taken up by a bibliography and several appendices.

In the summary of conclusions it is pointed out that embrittlement in boiler plate is caused by combined stress and chemical attack. Certain methods of water treatment tend to transform safe waters into the embrittling type. Methods for overcoming the trouble often work out, with regard to feed waters, but no steel suitable for boiler plate has been found which is resistant to the embrittling action of caustic acid.



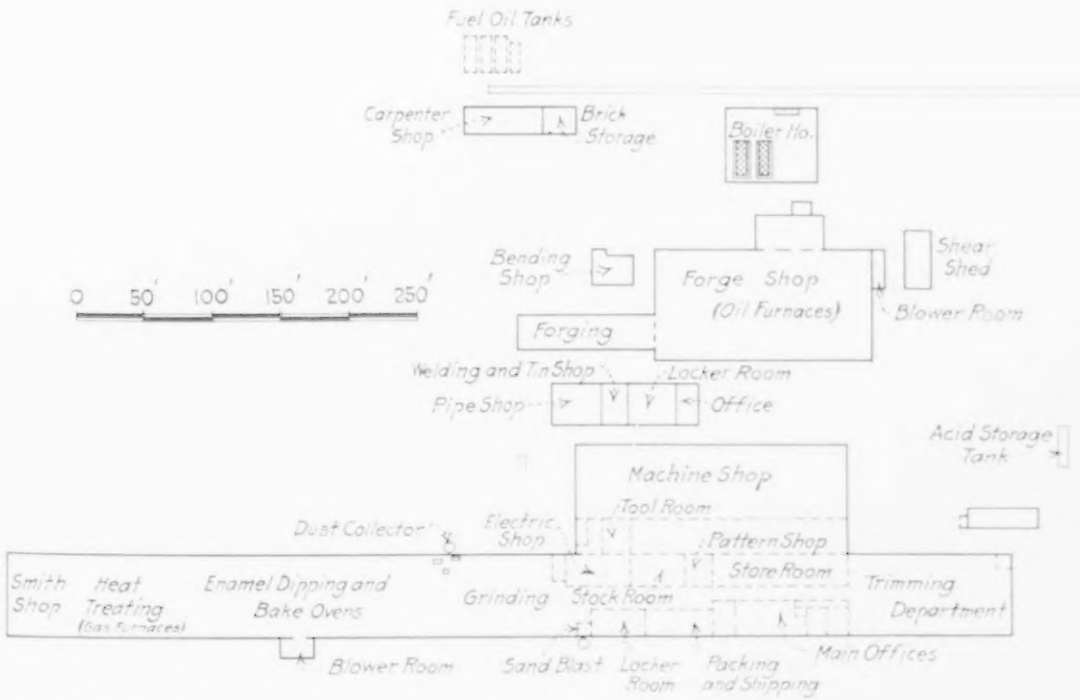
Modern Forging Facilities Improve Quality and Service

ESTABLISHED in 1880, the Herbrand Co. has grown with the progress of the drop forging industry, developing its manufacturing facilities to meet increasingly exacting demands for quality, service and economical production.

Methods and facilities outlined in this article include the lay-out and checking of dies, trimming of forgings, disposal of long flashings and the handling of dies and work within the plant.

METHODS employed by the Herbrand Co., Fremont, Ohio, illustrate recent developments in the drop-forging industry to meet the increasingly exacting demands of customers for service and quality and to attain economies in production through improved handling and other facilities. When this company was founded, in 1881, drop forging methods were little better than advanced blacksmithing; the evolution in the past half a century is apparent from a comparison of the company's present and original plants.

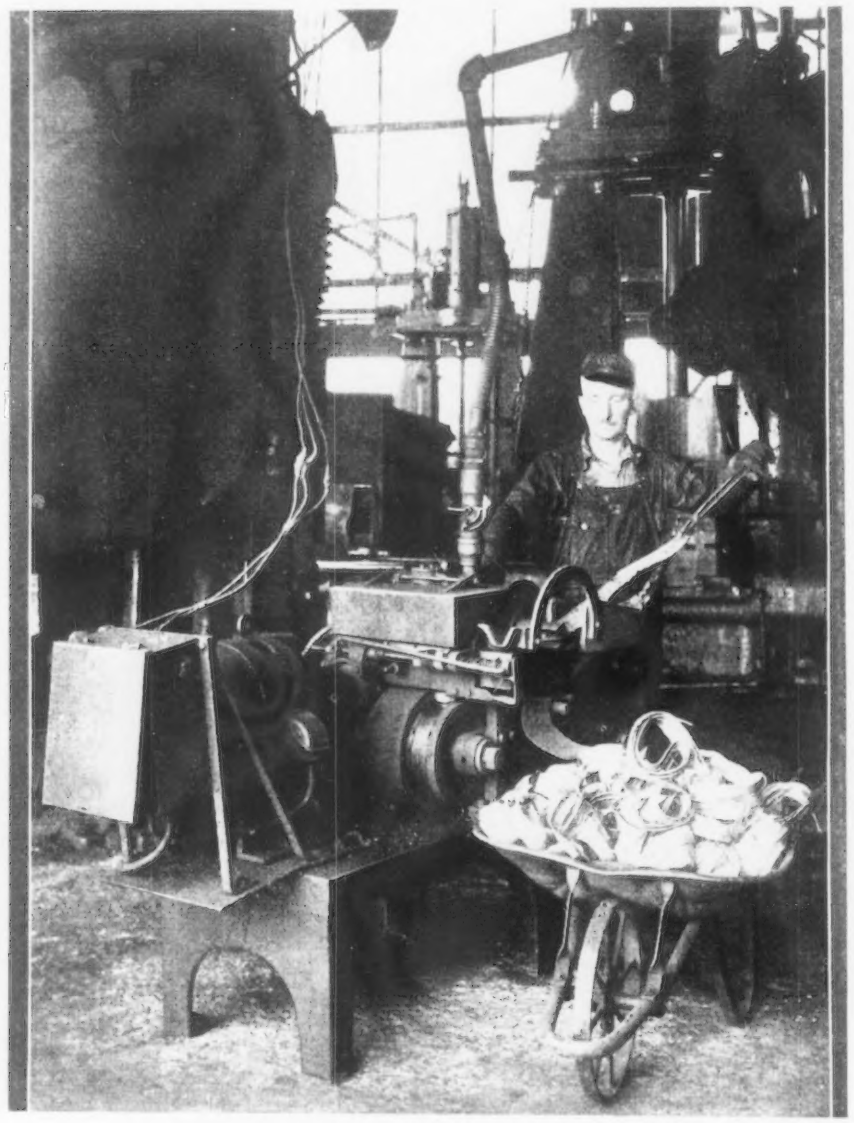
Modern machinery in the die department permits production of dies to the most exacting of specifications. Lead casts of all dies are very carefully checked by trained lay-out men to determine whether or not the impression has been machined to the dimensions specified on the blueprint. By this means any correction that may be required on the die is taken care of before a lead cast is sent to the customer, which not only speeds up production by getting the customer's approval to use the die promptly, but also prevents the possibility of confusion due to corrections being phoned or written in and not clearly understood by the vendor. When a job is under production, forgings are also carefully checked in the lay-out department to determine the amount of wear taking place in



STARTING a half century ago with a small building housing two drop hammers, the company has expanded progressively, its plant now comprising five buildings located on a 35-acre site.

the die. This is done periodically throughout the day so whenever a die starts to exceed the limits specified on the blueprint it is at once repaired or resunk.

Forgings made in the plant include front axle I-beams for automobiles as well as connecting rods, steering knuckles, double arms and other parts requiring precision work. In addition to the contract work the company also manufactures a standard line of wrenches and tools.



LONG flashings from front axle forgings are rolled up individually on special winding machines located back of the hammers. Scrap thus prepared is more convenient to handle and commands a higher price.

Rolled-Up Flashings Facilitate Handling and Command Higher Price

One of the special features of the forge department is that hammer bases are 50 to 100 per cent heavier than standard bases to assure rigidity of the machines, thereby making it possible to hold to very close limits on connecting rods and other forgings that allow very little tolerance both for weight and size.

Long flashings from front axle forgings go from the trimming presses to special winding machines designed by this company, in which they are rolled up separately into a convenient form for handling. Inasmuch as these flashings, that are in lengths from 30 to 36 in., are bulky and are difficult to handle because of their sharp ends. One of these motor-driven winding machines is located back of each hammer that produces forgings with the long flash. The end of the flashing is inserted in a slot in the winding machine spindle 3 in. in diameter, which when set in motion, makes a fixed number of revolutions and winds up the flashing from both ends, forming a roll 5 to 6 in. in diameter. This roll is ejected automatically into a wheelbarrow through the action of a cam within the drum of the machine that draws the spindle inside to perform this operation. The winding involves no extra labor inasmuch as the trimming press operator on pulling the flashing from the punch of the trimming press puts it into the winding machine instead of throwing it into a container.

The flashings in their rolled form are taken to the scrap yard where they are kept separate from other forms of scrap; because this scrap is in convenient form to handle in open-hearth charging boxes it usually brings $2 to $4 a ton more than it would if sold in the form in which it comes from the trimming presses.

Fuel oil for the forging furnaces is run through an oil mill to cut the solid particles and assure a free flowing fuel that atomizes as soon as the oil leaves the burner. Oil is stored in four underground tanks of 20,000-gal. capacity, and from these tanks it is pumped through a circulating system to the mill, then to the furnaces. Oil that is not consumed goes back through the system to the storage tanks, thereby preventing the clogging of oil in dead end lines. Steam coils are provided in the tanks to assure even temperature and free flow of the oil during the coldest weather.

Sectional Trimming Dies a Source of Economy

A cold trimming department is provided for forgings of sizes and analyses that can be cold trimmed, and a large part of the forgings are so trimmed because this speeds up production and reduces salvage work. Steam hammers of 1500-lb. size and larger, however, have their own trimming presses for alloy steel forgings and for other forgings that are too large to be handled in the cold trimming presses.

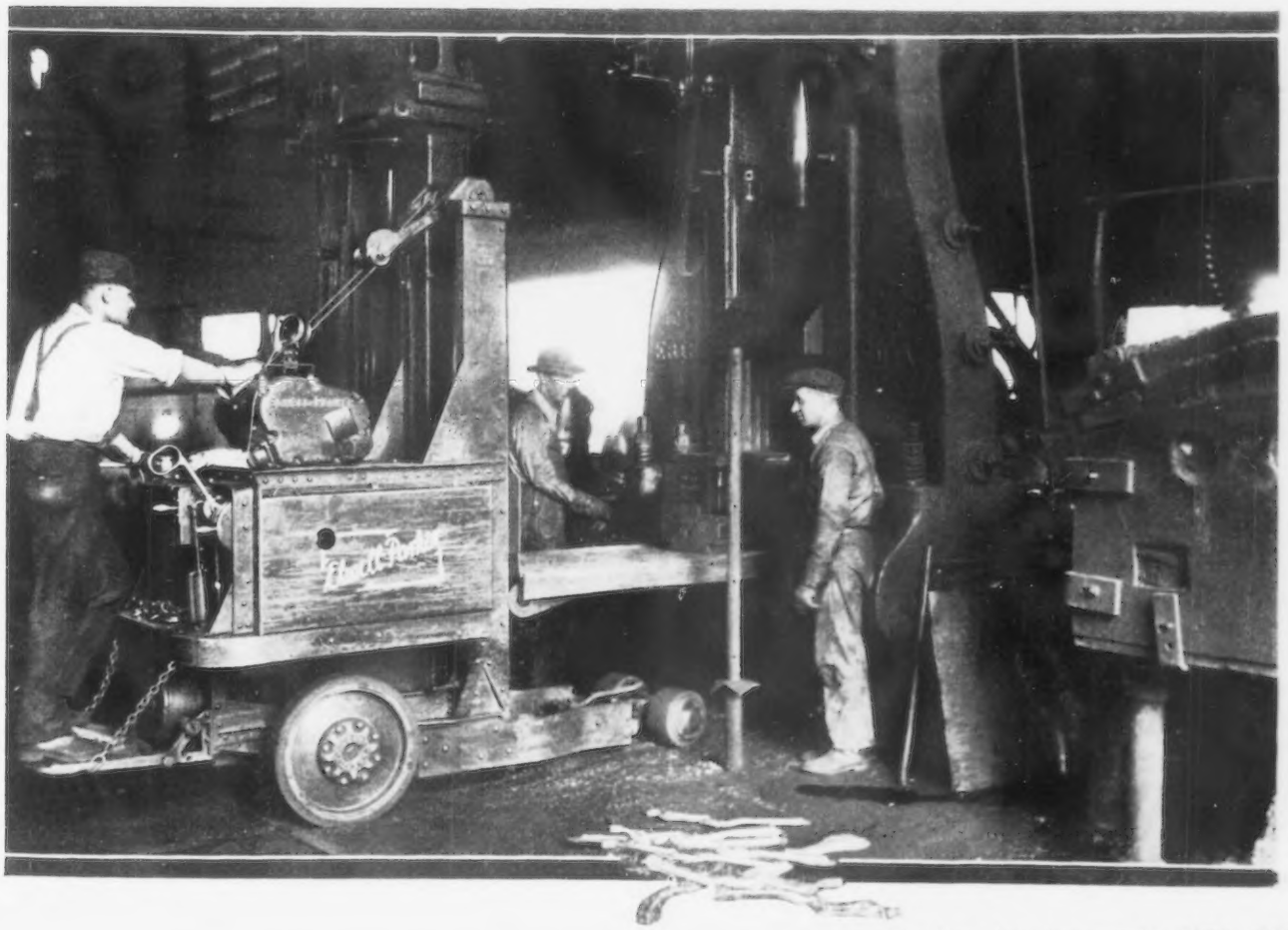
Economies are effected by the use of special sec-

ONE side of the heat-treating department showing the continuous type furnaces. Smaller continuous furnaces, box, cyanide and other types are also provided.

▼ ▼ ▼

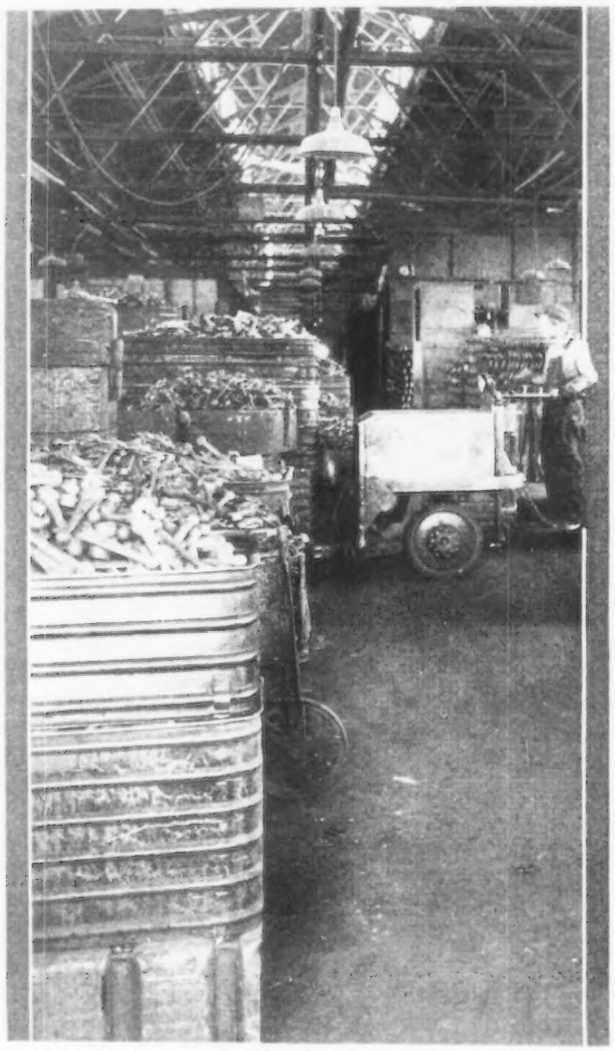
▲ ▲ ▲

ELECTRIC lift trucks have been installed for handling both dies and forgings. The high-lift is regularly used for putting dies in the hammers.



tional dies on both the hot and cold trimming work, these being made in from 4 to 12 sections, depending on the shape and size of the forgings, as compared with the usual practice of having these dies in two or three sections. A large number of sections make the dies readily adjustable to the contour of the part being trimmed and permit taking up wear of the forging die. Each section is adjusted by set screws and special castings are required for each trimming die shoe, the larger shoes being of cast steel and the smaller of cast iron. An advantage claimed for adjustable dies of this type is that a cleaner trimming job is secured, the amount of flash left on the forging being reduced and, consequently, less grinding is required to remove the flash. Thus grinding costs are kept down, and production is not retarded by an excessive amount of grinding.

An efficient unit for heat treating front axle I-beams consists of continuous hardening and drawing furnaces, the former being 40 ft. in length and the latter 50 ft., the drawing furnace being longer to allow forgings to be held at the drawing heat the required length of time. These furnaces are equipped with motor-driven pushers and automatic controls, as well as Leeds-Northrup control instruments governing the heats so that a uniformity of structure may be obtained throughout the entire lot of forgings.



BOXES of forgings are handled by means of the electric trucks. Space in the shipping room is conserved by nesting the loaded containers. Some of these have no bottoms, being built up in sections that are held in place by lugs on the side of the boxes.

Smaller continuous furnaces, also of the pusher type, are used in heat treating lighter forgings, such as connecting rods, steering arms and miscellaneous small parts; there are also a number of box-type furnaces, cyanide furnaces, and open furnaces for various classes of work required by the numerous customers.

Lift Trucks Handle Dies and Forgings

Electric lift trucks have recently been adopted by the company for handling all forgings and dies; they are used also for miscellaneous hauling work. Two 3-ton capacity trucks, built by the Elwell-Parker Electric Co., are used, one being a high-lift and the other a low-lift platform truck. Both are used for general hauling, but the high-lift truck is adapted especially for putting dies into hammers and presses. The low-lift truck is found convenient when box cars are to be loaded, since it is possible to pick up a tote box or skid loaded with forgings and place it inside the car being loaded with much greater ease and speed than with the handling methods previously employed by the company.

The battery charging department is conveniently arranged with charging tables between which the trucks are run when batteries are to be charged, a reserve battery being on charge while the one in the truck is discharging so that the trucks may be used on both night and day shifts simply by changing batteries. The batteries are special in that a 16-cell battery is made into a 15-cell unit and in place of the sixteenth cell there is an ampere-hour meter; with this arrangement every battery has its own meter which always stays with the battery, thus giving assurance that the battery is fully charged before leaving the charging platform, and shows at all times the condition of the battery. The distributing panel for the charging equipment is inclosed and while the batteries are being charged they are protected with a wooden cover, the purpose of which is to keep the battery clean and to avoid danger of a short circuit caused by metal falling on the top of the battery.

Sulphuric acid for pickling is stored in an 8000-gal. steel tank located on concrete piers from which it is taken as needed in a demijohn to the pickling department nearby. Instead of having the acid shipped in demijohns, as is customary, the company has it shipped in tank cars from which it is discharged into the storage tank; this method of handling avoids having a large number of demijohns lying around the yard where they take room and are in danger of becoming broken. As the acid is in concentrated form it may be kept in the storage tank indefinitely without danger of corroding the metal.

(*Concluded on page* 401)

Inspecting Steel Strip Magnetically

By W. T. SHEFFIELD

Metallurgist, Ferrous Magnetic Corpn., New York

COMPARISON of the magnetic properties of steels with those of established standards provides a practicable non-destructive test, according to the author, whereby accurate knowledge of the physical properties can be obtained.

Magnetic indications, he asserts, furnish a precise and consistent means of comparing materials, and this method is finding practical use in commercial inspection and process control.

IN recent years the application of magnetic testing to the commercial field of ferrous metallurgy has been studied by many workers. The value of such a non-destructive test of materials would be apparent, provided definite relations between magnetic and physical properties could be firmly established. Much careful detailed work has been done, particularly under the direction of R. L. Sanford of the United States Bureau of Standards, and much valuable data have been published, but, like many other apparently "simple" or "obvious" relations, investigation has disclosed the fact that the actual mathematical correlation of magnetic and physical properties is a very complex problem, the major complexity being introduced by the extreme sensitivity of magnetic properties to very slight changes in condition of strain or of structure. So many factors affect the magnetic properties that it has been very difficult to isolate and correlate definitely the effect of any one.

Certain fundamental truths have been established, however, which may be summarized as follows:

1. The magnetic properties of ferromagnetic substances are very closely related to the physical and chemical structure of such materials.
2. Stresses and resultant strains have a great influence upon the magnetic properties of ferromagnetic material.
3. For a given chemical and structural condition (which may be considered as the *resultant* of the entire antecedent history of the material) the magnetic properties of the material are peculiar to that particular condition and very slight changes in any one of the various phases of that condition result in a change in the magnetic properties.
4. It follows from (3), almost as a corollary, that if the magnetic properties of two test specimens are alike, the two specimens must be in the same physical condition.
5. In judging magnetic similarity, it is necessary to consider *all* magnetic properties; a judgment of similarity based upon measurement of but one or two magnetic properties is not valid.

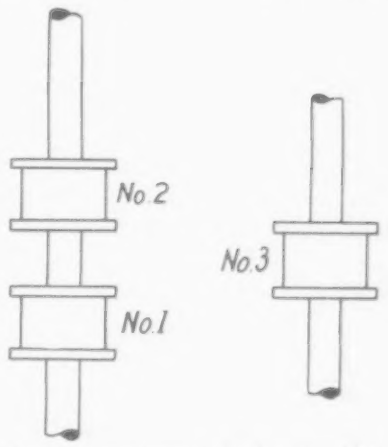


Fig. 1.—Arrangement of solenoids. Nos. 1 and 2 are interconnected for testing bars, billets or strips for uniformity and general characteristics. Solenoids Nos. 1 and 3 are interconnected for comparison of unknown characteristics (No. 1) to a standard specimen of known characteristics (No. 3).

The major portion of data, published hitherto in establishing these fundamental facts, has been obtained by direct-current test methods. In commercial application of magnetic testing, particularly in the field of electrical sheet steel, alternating-current test methods are used more extensively because of their simplicity and also because the information thus obtained is of greater practical application. Applied to the general metallurgical field as method of inspection, alternating current magnetic testing has brought about interesting developments of practical value.

The fundamental principle is the well-established hypothesis that magnetic similarity or dissimilarity indicates chemical and structural similarity or dissimilarity, as pre-

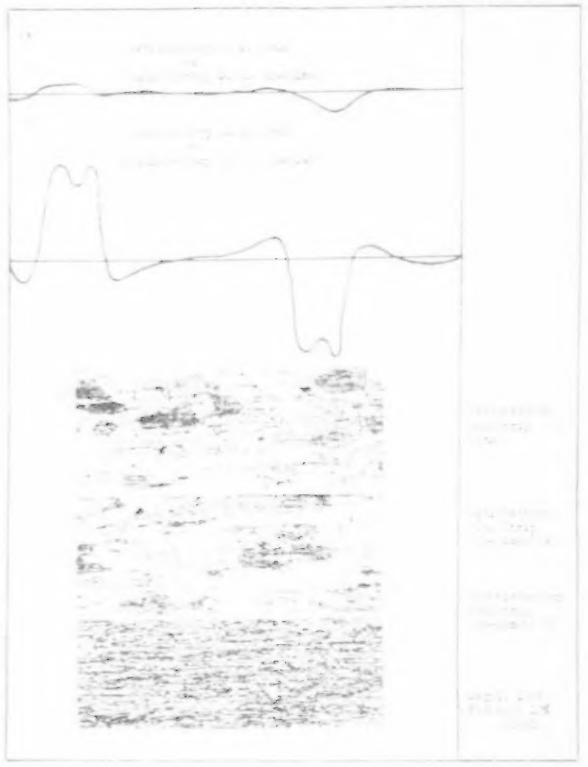


Fig. 2—Typical oscillograms and microstructures of strip steels in this and the next two reproductions.

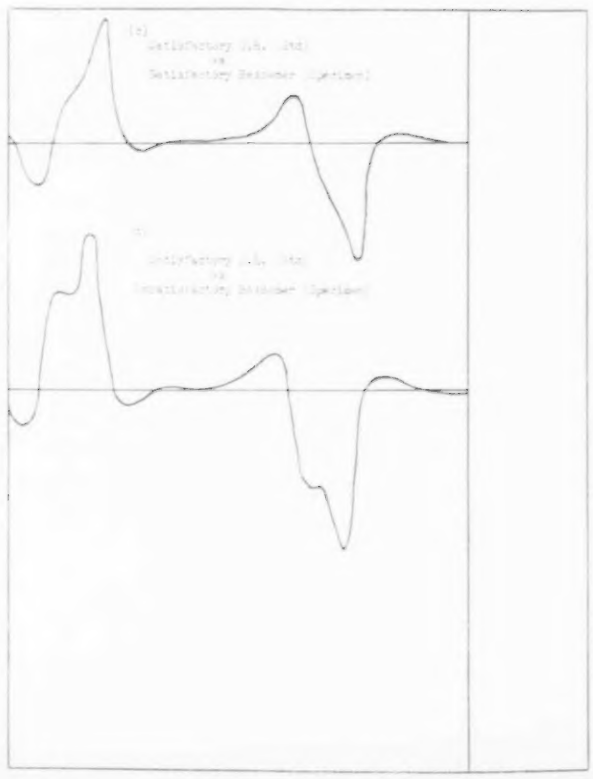
structed that, with an air core, the current from one secondary is exactly equivalent to that coming from the other secondary, but is of opposite polarity because of the "opposed" windings. The resultant, as shown on the oscillograph, is consequently a straight line. This is what is termed a "balanced" condition and is assurance that the magneto-motive forces acting in the indicating coils of the two solenoids are equivalent.

How the Solenoids Function

If two specimens of absolutely identical magnetic properties be brought into the system as the cores of the solenoids, one specimen in each coil, the relation of the current coming from one secondary to that coming from the opposed secondary would be the same as with an air-core, i.e. absolutely equivalent, and the oscillograph would again show a straight line.

This is a purely *hypothetical case*, however, as it is extremely doubtful if two such absolutely similar specimens could be produced. When two specimens, which are to all practical purposes identical as to chemical and structural composition, are compared magnetically by this method, there is always a slight difference in their magnetic characteristics so that the current from one secondary is slightly greater than the current from the opposed secondary. In this case, the resultant wave-form shown on the oscillograph is a regular sinusoidal curve of low amplitude whose polarity will be that of the secondary coil which is giving the stronger manifestation.

It can readily be seen that in this method of testing, because of the opposed secondaries, the wave-form shown on the oscillograph represents the *total resultant magnetic differences* between the specimens which have been placed in the solenoids, and also indicates by its polarity which specimen is giving the major manifestation. If this resultant magnetic dif-



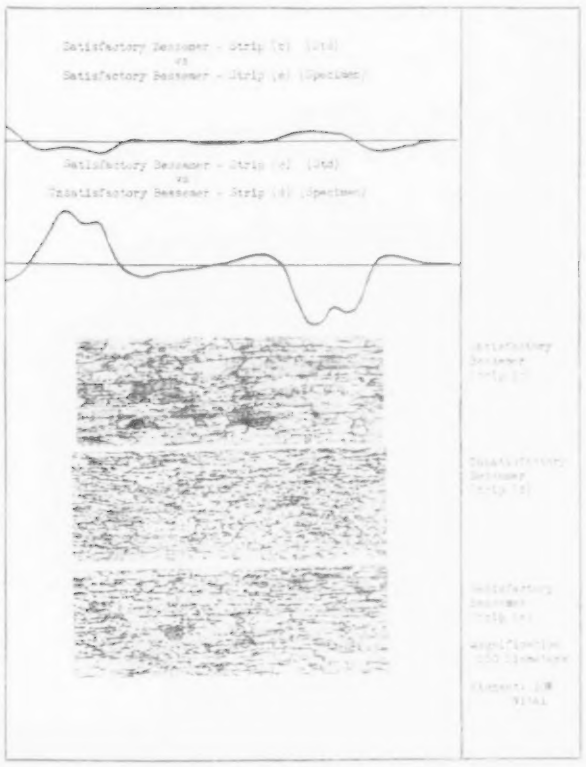
ference be very slight, for all practical purposes, the specimens may be considered structurally identical and the indication as shown by the oscillograph will be a smooth, regular sinusoidal curve of low amplitude. As the difference between the structures of the two specimens increases, this smooth, regular sinusoidal wave-form becomes distorted, the degree of such distortion being comparable to the degree of structural differences which is indicated by it.

A Complete Unit Described

A complete unit for this type of magnetic testing usually consists of three "balanced" solenoids, such as have been described, and an oscillograph. By employing interchangeable secondary coils of various sizes and shapes, the apparatus can be adapted quickly to any size or shape of bars, billets, or strips. The solenoids are arranged as shown in Fig. 1.

In testing for uniformity and general type of magnetic characteristics, coils Nos. 1 and 2 are interconnected by appropriate switches so that their primaries are in series and their secondaries opposed. It is evident that, as the bar, billet, or strip is passed through the solenoids, each successive portion in solenoid No. 1 is being compared magnetically with that portion of the same bar, billet, or strip which is within solenoid No. 2 at that particular instant. Variation of the wave-form shown on the oscillograph as the specimen passes through the solenoids would indicate lack of uniformity in that particular bar, billet, or strip and, by marking the area in the coils corresponding to the change in wave-form, the areas of non-uniformity can be located definitely.

If it is desired to compare a specimen of unknown characteristics with a known standard, solenoids Nos. 1 and 3 are interconnected by appropriate switches, primaries in series, secondaries opposed as before.



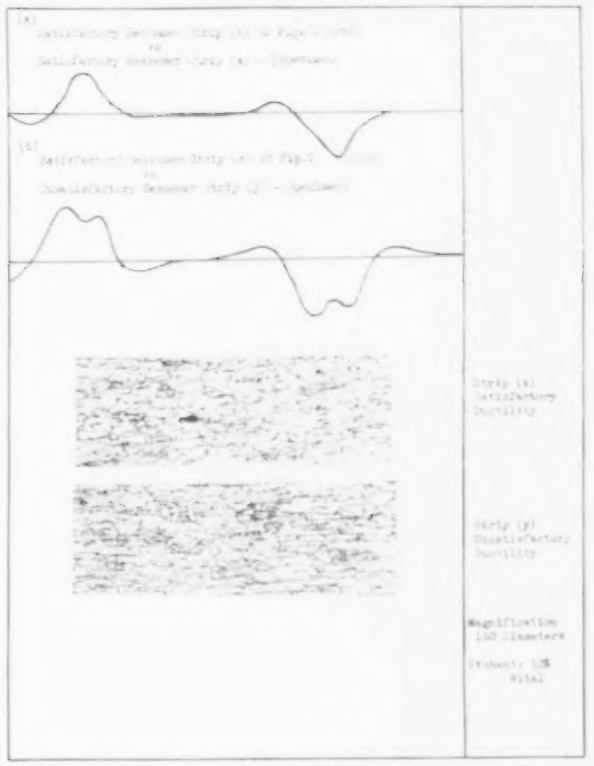


Fig. 3—Oscillograms and microstructures of two Bessemer strips compared with a satisfactory Bessemer strip as standard.

The "standard" specimen is placed in coil No. 3 and the "unknown" is moved through solenoid No. 1. It is evident that each successive portion of the "unknown," as it passes through solenoid No. 1, is being compared magnetically with the "standard" of known physical or structural characteristics. This method of test gives a positive comparison with an established standard and is recommended particularly for inspection purposes. Material which has been found to be satisfactory is utilized as the "standard," and it is a simple matter to ascertain whether or not the material being inspected is similar to the standard already established.

In Fig. 2 and the following illustrations are shown a few typical oscillograms obtained by this method of magnetic testing and the microstructures of the corresponding areas. Careful study of these oscillograms will reveal the practical utility and reliability of the method.

The oscillograms shown in Fig. 2 a, b, c, and d were obtained by comparing low-carbon steel strips of varying ductility with a satisfactory strip of open-hearth steel as a "standard":

(a) is the oscillogram obtained in comparing satisfactory open-hearth material to the standard or, as it is usually termed, satisfactory O.H. (std) vs. satisfactory O.H. (specimen).

(b) is the wave-form given in testing unsatisfactory open-hearth strip against satisfactory open-hearth, or satisfactory O.H. strip (std) vs. unsatisfactory O.H. strip (specimen).

(c) is the wave-form obtained in comparing satisfactory strip with the satisfactory open-hearth

(std), or satisfactory O.H. (std) vs. satisfactory Bessemer (specimen).

(d) is the wave-form given by unsatisfactory Bessemer, or in other words, represents the magnetic comparison—satisfactory O.H. (std) vs. unsatisfactory Bessemer (specimen).

In each case of unsatisfactory material the ductility was poor, as evidenced by "cupping" and "bending" tests.

Particular attention is called to oscillograms (a) and (c) as illustrating sensitivity of this method of

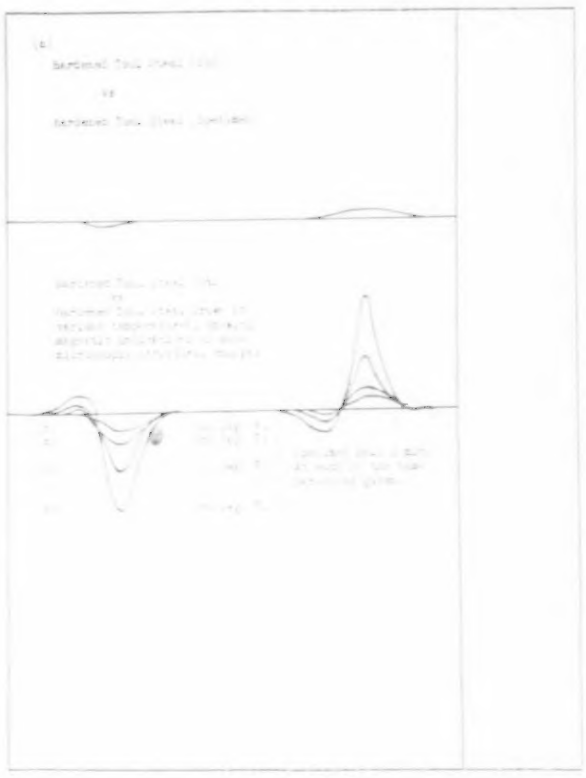


Fig. 4—A series of oscillograms which record the minute changes occurring in tempering hardened tool steel.

test. Each of these oscillograms represents satisfactory material as compared with the open-hearth standard, but of two distinct types, one (a) being open-hearth and the other Bessemer (c). The chemical analyses of the standard strip, and of strips (a) and (c) are as follows:

	Std. (O.H.) Per Cent	(a) (O.H.) Per Cent	(c) Bessemer Per Cent
Carbon			0.10
Silicon			0.04
Manganese			0.40
Phosphorus			0.09
Sulphur	0.04	0.03	0.05

Microscopically there is really no significant difference between the two strips; in ductility tests the Bessemer strip gave consistently lower values than the open-hearth, but, at the same time, was sufficiently ductile to be considered satisfactory. The difference between oscillograms (a) and (c) therefore represents the combined or inter-related effect of the difference in chemical analysis and the difference in ductility.

In oscillogram (a) the variation in chemical analysis between the specimen and standard is practically nil, ductility tests showed only a slight difference in ductility, confirming the magnetic indication of similarity. On the other hand, in oscillogram (c) considerable variation of specimen from the standard is indicated, and corroborated by both chemical analysis and ductility tests.

Bessemer Strips Compared Magnetically

If now we were to compare satisfactory and unsatisfactory Bessemer strips with a satisfactory Bessemer strip as a standard, having eliminated one variable (chemical composition), we would expect the curves to simplify and show a smaller degree of difference. That this is the case is indicated in Fig. 2, (e) and (f), which show oscillograms obtained in comparing (e) satisfactory Bessemer (strip e) and (f) unsatisfactory Bessemer (strip d) respectively with satisfactory Bessemer (c) as a standard. It is evident that the separation of satisfactory from unsatisfactory material is very simple, once the appropriate standards have been established.

Illustrating the Consistency and Accuracy

The consistency and accuracy of this type of magnetic test are also indicated in Fig. 3, (a) and (b), which show the oscillograms of two Bessemer strips compared with a satisfactory Bessemer strip as a standard. There is no significant difference in microstructures, as can be seen by comparison with microstructures of satisfactory strips shown in Figs. 2 and 3, all apparently being fairly well annealed. The chemical analyses of the two strips (Fig. 3, a and b) are practically identical, being as follows:

	Std. Per Cent	Fig. 3 (a) Per Cent	Fig. 3 (b) Per Cent
Carbon	0.10	0.09	0.08
Silicon	0.005	0.02	0.01
Manganese	0.4	0.43	0.40
Phosphorus	0.107	0.08	0.091
Sulphur	0.046	0.42	0.042

The magnetic test indicates emphatically that there is a structural difference between the two specimens. Ductility tests corroborate this indication, the strip shown in Fig. 3 (b) having failed in both cupping and bending tests. It is apparent that the magnetic test indicates structural differences which are not shown significantly by the microscope, yet actually exist, as evidenced by physical tests and behavior of the material under practical shop working conditions.

Testing Hardened or Tempered Steels

This characteristic of magnetic testing makes it of particular value in testing hardened or tempered steels, either as a method of inspection or as a means of control of heat-treating processes. Because of the irresoluble nature of the components of hardened or quenched steel, subtle changes of structure due to slight variations in temperatures are very difficult to detect microscopically, yet have very distinctive effects upon the resultant physical characteristics of the material.

The sensitivity of the magnetic indications to these sub-microscopic changes is shown in Fig. 4, (a) (b) (c) (d) and (e). This series of oscillograms records the minute changes occurring in tempering hardened tool steel. Oscillogram (a) was obtained by comparing the original quenched specimen with itself. This

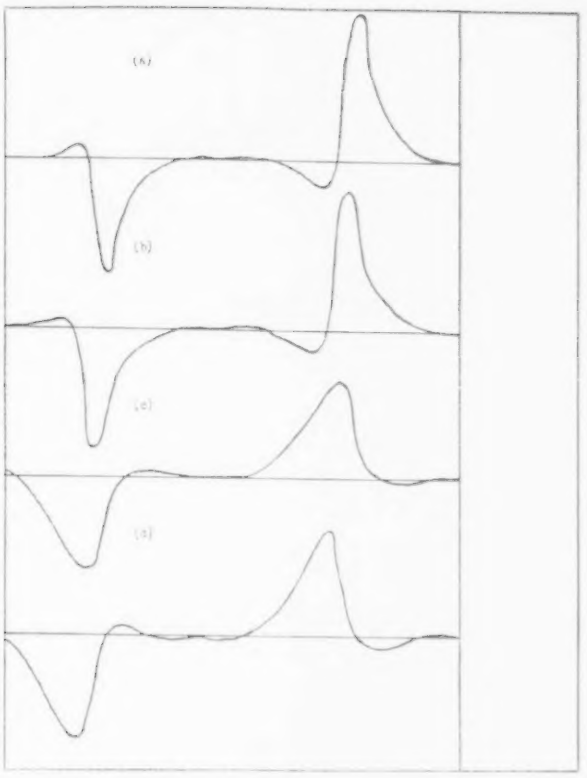


Fig. 5—(This and the other illustration on this page). Oscillograms of four specimens of strip steel tested against a standard. Microstructures verify the accuracy of the magnetic indications.

was done by cutting the piece in two equal parts and placing one piece in each solenoid in the "standard" method of testing.

One piece was removed and heated successively to the temperatures shown for 5 min., the oscillograms being drawn after each heating, giving oscillograms (b), (c), (d) and (e). It is well known that changes in drawing below 350 deg. F. cannot be detected microscopically, but the magnetic test gives unmistakable indications of structural changes at drawing temperatures as low as 240 deg. F.

Separation of Mixed Lots

Still another application of this type of magnetic testing is the separation of lots that have become mixed accidentally or whose identification markings have been obliterated. For this purpose it is immaterial whether or not the characteristics of the "standard" be known; all that is necessary is that the "standard" be such as to give distinctive indications when compared with the unknown material, and that the same "standard" be used for the entire series of tests. The principle of this comparison is that, if two similar specimens A and B are successively compared magnetically with a third specimen (standard), the two resulting oscillograms will be generally similar, regardless of the nature of the standard, and vice versa, if A and B are different the resultant oscillograms will be different.

That this condition must exist is apparent from consideration of the system of opposed secondaries. The current coming from the coil in which the standard is placed is a constant factor in each test; hence the variation in the successive oscillograms must correspond to the variations in the corresponding test specimens as they are placed successively in the coil opposed to C.

A concrete illustration of this principle is given in Fig. 5, a, b, c, d, which are oscillograms obtained in testing four specimens of strip steel against a constant standard. It is apparent that oscillograms (a) and (b) are similar, as are also oscillograms (c) and (d). Hence specimens (a) and (b) must be similar, and specimens (c) and (d) must also be similar. Neither oscillogram (a) nor (b) is similar to oscillogram (c) or (d); hence specimens (a) and (b) must be different from specimens (c) and (d).

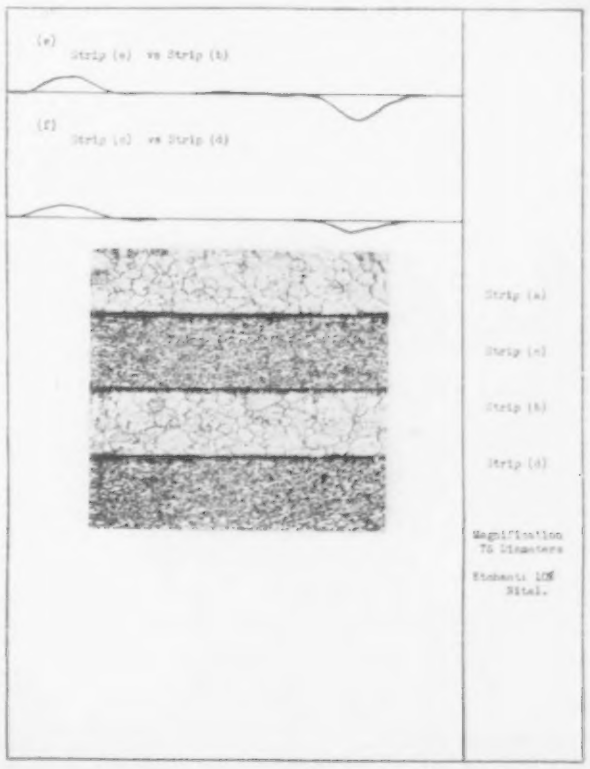
Similarity of specimens (a) and (b) was verified by placing (a) in one solenoid and (b) in the other, with the resultant sinusoidal wave-form of low amplitude shown in Fig. 5 (e). Similarity of specimens (c) and (d) was verified in like manner as shown in Fig. 5 (f). Microstructures of the four specimens at 75 diameters are shown in Fig. 5 and verify the accuracy of the magnetic indications.

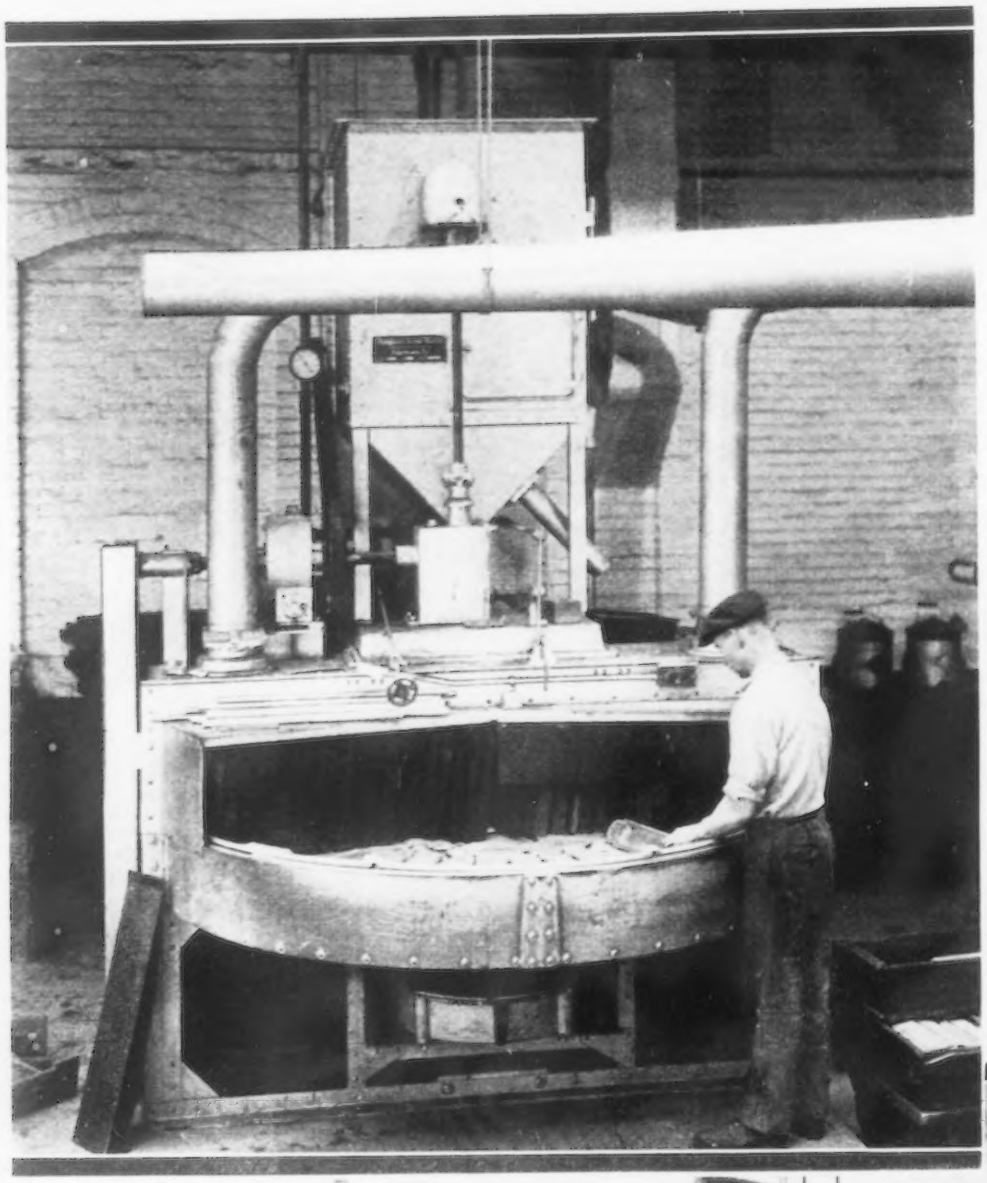
Conclusions

In conclusion, the writer wishes to emphasize the fact that no attempt has been made in this discussion to correlate any of the oscillograms with any particular structure or change of structure. The series of tests has been described with but one purpose in view—to show the possibility and practicability of a non-destructive test by which accurate knowledge of the properties of material can be obtained by comparing their magnetic properties with those of established standards.

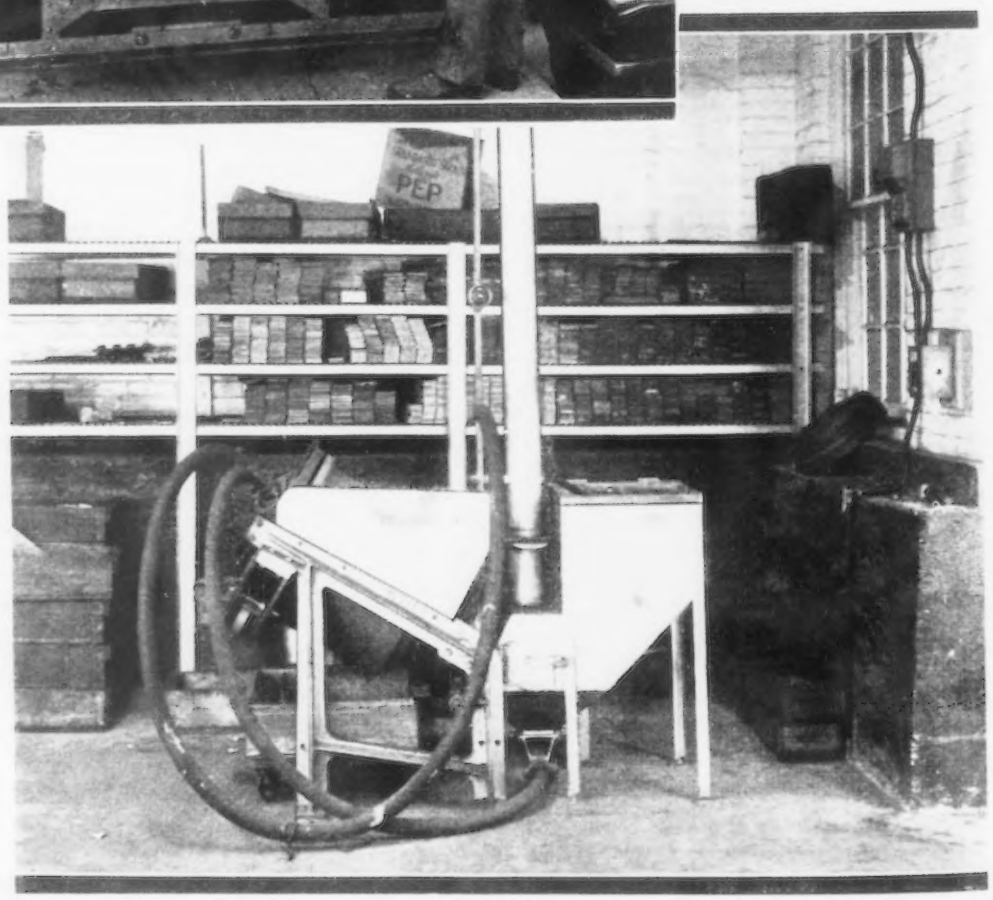
The oscillograms described indicate only magnetic

(*Concluded on page 447*)





MOTOR-DRIVEN rotary-feed table on which large, flat work is uniformly finished.



SLY motor-driven tilted mill for producing a matted surface on small work that may be tumbled in a barrel without injury from the pieces of work hitting against each other.

Economies Effected by Using Steel Grit for Sand Blasting

By WALTER J. SORROW

SAND forced through an orifice by means of air pressure has an abrasive action which has been known and made use of for many years. The various users are familiar with its application in effectively cleaning castings as received from the foundry, for cleaning buildings, cutting stone, cleaning before enameling, and many other uses. But few people appreciate its value as a finish, or realize the part it plays in the production of builders' hardware.

Much present-day hardware is desired in a dull satin finish, which has been produced by applying fine silica sand under 60-lb. air pressure against the metal pieces, creating much dust but producing a very smooth, uniform, mat finish. However, medical science has proved that a lung disease, known as "silicosis," exists among workers continually breathing air heavily laden with the dust created by silica sand.

It was toward elimination of this dust hazard that the engineering department of the P. & F. Corbin division of the American Hardware Corpn., maker of hardware, turned definite efforts toward finding a substitute which would eliminate this health hazard.

Test quantities of alundum, silica sand and commercial steel grit were tried, using 200 lb. of each material, and noting the number of pieces of work blasted before the 200 lb. was exhausted. It was found that the silica sand broke down at 4700 pieces, the alundum at 20,000 pieces, while steel grit ran in excess of 80,000 pieces. This test showed one ton of steel grit to be equal to 20 tons of silica sand.

BATTERY of six hand cabinets designed by P. & F. Corbin engineers, one of which has an extension at the rear to make it suitable for finishing long rods.

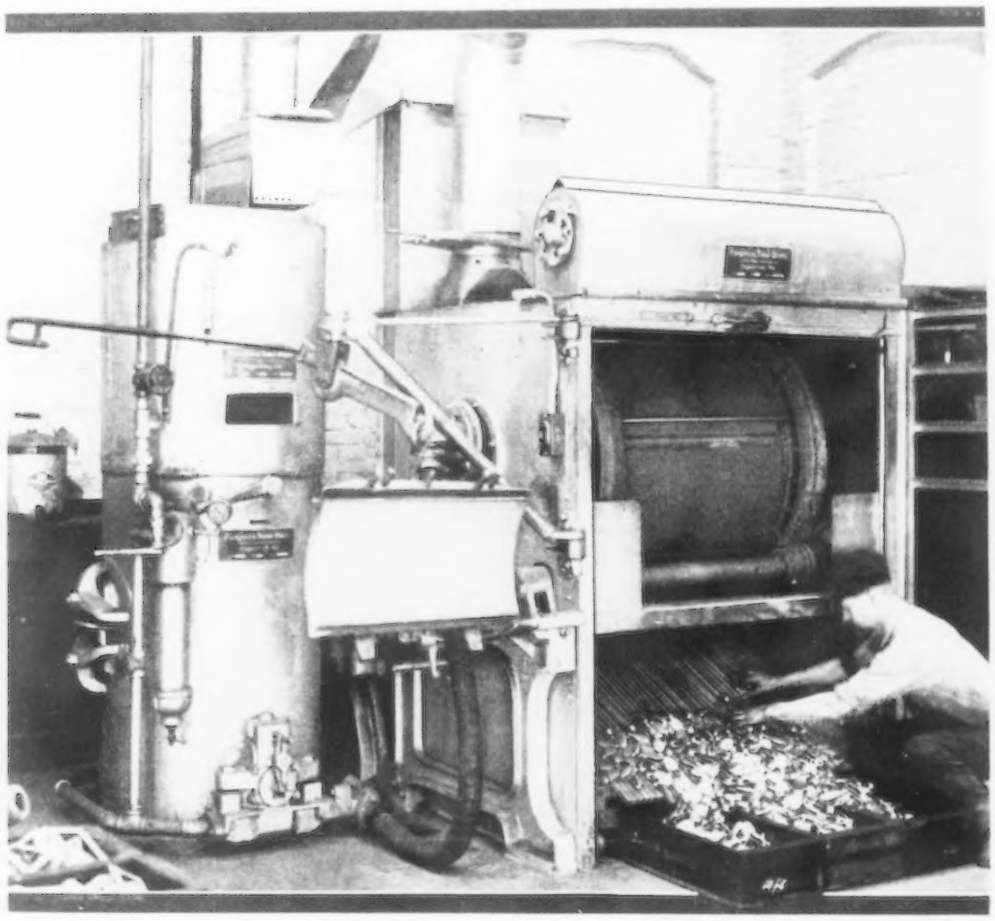
which would more than offset the difference in cost—$6 a ton for the sand, including freight charges, and $100 a ton for the steel grit. Moreover, practically no dust was visible in the cabinets with steel grit.

After trying several grades of this grit at various air pressures, it was found possible to produce a satisfactory finish, and also to eliminate the health hazard of sand, and to show a substantial cost saving in addition. With sand it was necessary to clean the screen separator on the exhaust system twice a week, whereas with steel grit once in three months suffices. The saving in labor, from handling 16 tons of steel grit a year against 330 tons of silica sand, is no small item.

There were also other advantages derived from the use of steel grit. In the plating department, for example, it was necessary to dip work in acid to remove from its surface silica imbedded in the metal; if this was not done, a poor finish was obtained, since silica is not an electrical conductor. With steel grit such a condition is not possible, since steel is an electrical conductor. Likewise, in the case of work to be japanned or lacquered, the cleaner surface produced by steel grit facilitated the operation.

Then there was a great saving in the iron nozzles from which the mixture of air and sand or steel grit emerged. Where three nozzles a day were used with the sand, one nozzle lasted from three to four weeks with the steel grit. In general, it was found that there was less wear on the metal parts of the equipment, and less replacement was the net outcome. Considerable savings were indicated from the number of shovels, sieves and other equipment required.

The company's engineers laid out a department embodying efficient methods of handling work and material, and designed special hand blast cabinets suited to their particular work, which automatically use steel grit over and over again without handling by manual labor. They also have installed in this department one tilted mill for small work in odd lots, one pressure-feed barrel for larger work, and one 8-ft. diameter gravity-feed rotary table for large flat work not suited to the barrels. An efficient exhaust system removes all dust from the hand cabinets and machines, while a vacuum cleaning system removes and reclaims grit from the floor near the machines.



PANGBORN pressure-feed, motor-driven barrel for large work.

In the hand cabinets the finest of small work is finished by hand. The work is inserted in the cabinets through sponge-rubber curtains and held by the hand while a mixture of grit and air at a pressure of about 60 lb. to the square inch strikes the exposed surfaces. The exhaust system carries away the dust from the inside of the cabinets, which are illuminated by daylight electric lamps. One filling of the cabinet with grit lasts from three to four weeks and, of course, there is no dust from the grit present in the outside atmosphere to render the working conditions unhealthful. The grit in the cabinet is automatically recirculated by means of air pressure and gravity.

There is not a department in the whole plant which is cleaner or a more healthful place in which to work, and the company points to it with just pride.

Typical Installations of Coreless Induction Furnaces

By DR. E. F. NORTHRUP

Vice-president and Technical Advisor
Ajax Electrothermic Corp., Trenton, N. J.

▲ ▲ ▲

SOME modern installations of the coreless induction furnace for melting steel are discussed by Dr. Northrup in this, the third and last article of the series. Several classifications for the practical and economic melting of metals with this type of furnace are presented. Its usefulness as a refining furnace and as a ladle is covered.

The author's views as to the future of industrial melting conclude the article. A comprehensive bibliography is appended.

▼ ▼ ▼

PRACTICAL and economic melting by coreless induction may be conveniently considered under the following classifications:

a. Melting non-ferrous metals and non-ferrous metal alloys which fuse at a moderate temperature, as pure silver and Sterling, pure copper and its various alloys such as monel metal, nickel-silver, etc.
b. Making high melting semi-ferrous alloys to precise specifications, as nickel-chromium, Stellite, etc.
c. Recovery of ferrous metal scrap without alteration of composition due to the melting process, as stainless and rustless steel, magnet steel, high permeability iron and alloys such as permalloy, etc.
d. Melting ferrous metals to which alloy additions are made for pouring ingots of special composition, as shear-knife steel, high-speed steel, ordinary tool steel, etc.
e. Melting to put in ingot form certain high melting metals, as pure nickel, pure cobalt, pure iron from sponge iron, etc.
f. For melting ferrous alloys, as ferrosilicon, ferromanganese, ferrovanadium, ferrochromium, etc., to be used as liquid additions either to the charge in a very large arc or open-hearth furnace or in the ladle.
g. Melting with a small furnace, tapped on a line feeding large furnaces, for making experimental steels and alloys previous to commercial melting.
h. For making silicon steel ingots of low-carbon content for rolling into sheets for transformers, etc.
i. For making any ferrous-alloy which must be kept exceedingly low in carbon, as deep drawing stainless steel.
j. Foundry casting of alloy steel.

(a) Consult "Industrial Electric Heating," by N. R. Stansel and E. F. Northrup, Part V, *General Electric Review*, April, 1928.

(b) See paper by Robert H. Leach, given before the American Electrochemical Society at Bridgeport, Conn., April 26 to 28, 1928.

Installations

Coreless induction furnaces energized with power derived from a motor-driven generator were first used commercially for carrying out operations under classification "a."

The American Brass Co. was a pioneer with two 600-kw. motor-driven generators and 12 100-kw., 650-lb. furnaces operated by them. These furnaces have been used chiefly for melting nickel-silver scrap and for the production of the alloy from its pure metal constituents. This was early in 1926 at its Waterbury, Conn., plant. Other equipment has been added since in other plants of the same company, which brings the power employed up to nearly 3000 kw.

Fig. 12 shows one of the furnaces (of early design) pouring nickel-silver. The furnaces have also been used for melting copper, aluminum and miscellaneous non-ferrous alloys.

The performance of these early furnaces on copper was 361 kwhr. (metered at the furnace) per net ton. The conversion efficiency of the motor generator set was about 72 per cent (a). Better designs now available for both generators and furnaces should improve this performance.

A 100-kw. furnace at the plant of Handy & Harman, Bridgeport, Conn., has been in service some years for the recovery of Sterling scrap (b).

These two installations are referred to here to illustrate the versatility of the coreless inductive method of melting. The writer believes, however, that

the most congenial place for coreless inductive heating is in the ferrous field. Here the temperatures are high and the carbon content must be small or controlled, and homogeneity of alloys is essential—a matter which the coreless induction furnace can take care of admirably. Under classification "b" the coreless induction furnace is rendering a valuable service. Fig. 13 is one of the furnaces used at the plant in Detroit of the Hoskins Mfg. Co. This company installed first 150 kw. and later expanded by installing an additional unit of 300 kw. The furnaces are used almost exclusively for making "Chromel" (chromium-nickel alloy).

As it is not necessary to leave a "heel" in the furnace when a pour is made (as is required with a so-called "ring-type" induction furnace and often in the 60-cycle coreless induction furnace) and as the stirring of the alloy is active, they are able regularly to repeat composition and quality of ingot metal. The refractory holds up so well that as many as 400 heats of 600 or 1000 lb. can be poured without repacking the furnace. These results were obtained with linings of electrically sintered magnesia.

It is probable that the use of coreless inductive heating under classification "c" is the most valuable at the present time. Stainless and rustless steel scrap is accumulated at the rate of about 30 to 35 per cent of all such steel made. It has been demonstrated that this scrap in the physical state in which it occurs can be remelted and poured into ingots which will have almost precisely the same chemical composition as the scrap fed to the furnace.

Furnaces of $3\frac{1}{2}$ tons holding capacity, powered each with 1125 kw., are now under construction which are to be used for this purpose, as well as for that listed under classification "f." There is no opportunity for the metal to become oxidized or to gain or lose any chemical constituents, and the stirring of the metal insures that the alloy will be homogeneous and very clean.

Fig. 14 shows a nominal 1000-lb. furnace pouring 1100 lb. of rustless steel. This is one of two furnaces which belong to the Lebanon Steel Co., Lebanon. They are used alternately and are powered with kw. They each melt 1100 lb. of scrap ready to in about 55 min.

Certain tests have shown that a furnace of 100 capacity, used without a cover, loses only three-tenths of 1 per cent of the 18 per cent of chromium in the alloy. It is expected that a larger furnace, with a cover, will lose practically no chromium.

Coreless induction furnaces of $3\frac{1}{2}$ tons capacity are expected to be used commercially for melting ferrous metals to serve as liquid additions, as listed under classification "f," by the middle of 1931.

Furnaces for uses under classification "d" were the first put in service. Such well known installations as the following may be mentioned in this connection:

United States:
Babcock & Wilcox Tube Co., 150 kw.; Firth-Sterling Steel Co., 450 kw.; the Heppenstall Co., 150 kw.; the Midvale Co., 200 kw., and others.

England:
Edgar Allen & Co., Ltd., 150 kw., and about six others.

France:
Schneider & Cie., 400 kw., a French steel works; two installations, using 950 kw.

Germany:
Eisen & Stahlwerk Hoesch, A. G., 300 kw., and three others using in all 470 kw.

Japan, Sweden and Switzerland are likewise melting ferrous alloys as covered in classification "d."

Pure metals have been melted frequently and cast into ingots, as listed in classification "e," but no user is as yet employing a coreless induction furnace exclusively for this purpose.

Under classification "f," no furnace has been put into service for this purpose, but an order is now being filled in which 1125 kw. (same as referred to above) will be used as part of the customer's program for melting ferroalloys to add in liquid form to a charge of many tons in a very large furnace.

A small furnace, classification "g," which

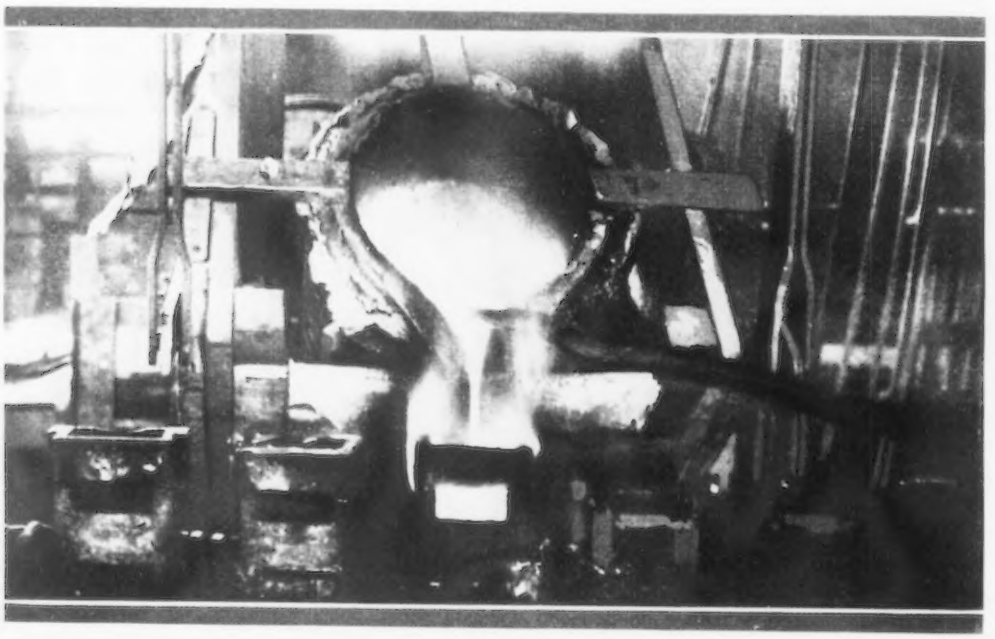


Fig. 12—Early design of high-frequency furnace pouring nickel-silver at plant of American Brass Co.

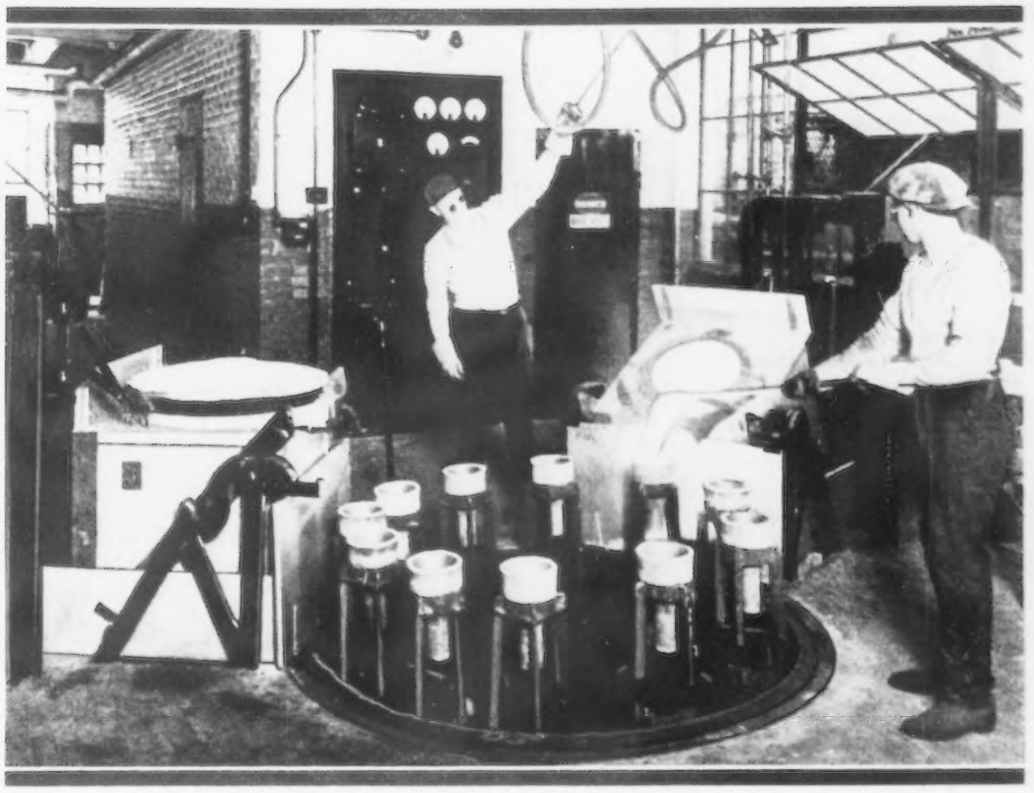


Fig. 13—A high-frequency furnace in use by the Hoskins Mfg. Co., Detroit.

may be operated from the commercial high-frequency service lines while commercial melting is in progress, is used to high advantage by several users to try out special compositions before melting them commercially.

No use has thus far been made of the furnace for melting silicon steel, as under classification "h," but the writer believes this is an important field for the furnace.

Melting of practically carbon-free ferrous metals and alloys, falling under classification "i," is accomplished ideally in a coreless induction furnace. The Westinghouse Electric & Mfg. Co. made many tons of permalloy with a carbon content reported to be often as low as 0.006 per cent. As no carbon whatever is associated with the furnace proper, the possibilities of almost absolutely carbon-free melts in small and large scale operation certainly open up to the ferrous metallurgist an alluring prospect.

Finally, we have the wide usefulness for the furnace under classification "j." The foundry casting of alloy steels such as rustless steels, etc., is rapidly finding an extended use. Fig. 15 is a view of furnaces used by the Babcock & Wilcox Tube Co., at whose plant steel castings are made either by pouring into the molds directly or by pouring into ladles of appropriate size and from these into the molds.

The largest and by far the most important installation used almost exclusively for pouring steel castings is the equipment now employed at the Watertown Arsenal, Watertown, Mass. Here 750 kw. are available, obtainable from one generator unit of 150 kw. and from one of 600 kw. A 600-lb., a 1000-lb., a 2000-lb. and a 4500-lb. furnace may be connected in turn or in certain combinations to these sources of high-frequency power. When the steel is melted in a furnace of appropriate size, this is lifted from its trunnions by a frame and carried in the manner of moving a ladle to the casting machine, and the metal is poured directly into it. At the time of moving the furnace, all electrical and water hose connections are detached. The casting machines were developed at the arsenal and are used for centrifugally casting guns of several different sizes.

The casting machines are horizontal and rotate, and the molten steel, when poured in, takes by centrifugal force the desired shape.

Coreless Induction Furnace as a Refining Furnace and Ladle

The usefulness of a coreless induction furnace for refining must be decided by the metallurgist. Few designers of electric furnaces are also experienced metallurgists. The designer makes a "tool," and the metallurgist uses it. Only by close cooperation between those trained electrically and those experienced in metallurgical operation can the best results be secured. The writer is not a metallurgist; and therefore, he can only speak with confidence on how the "tool" as such will perform. The metallurgical suggestions to be offered are based on what his metallurgical friends have told him.

If the structural features of a large furnace, earlier described, are employed, the coreless induction furnace may be considered as a large ladle which may be picked up by a crane, carried about and poured. The structural features are such that there is no reason to suppose that a furnace ladle may not be successfully constructed and handled, though made in a size which will hold many tons. Thus constructed, it would combine all the handling facilities of the usual steel-clad ladle and the heating and stirring-of-metal features of a furnace.

By supplying the furnace ladle with high-frequency

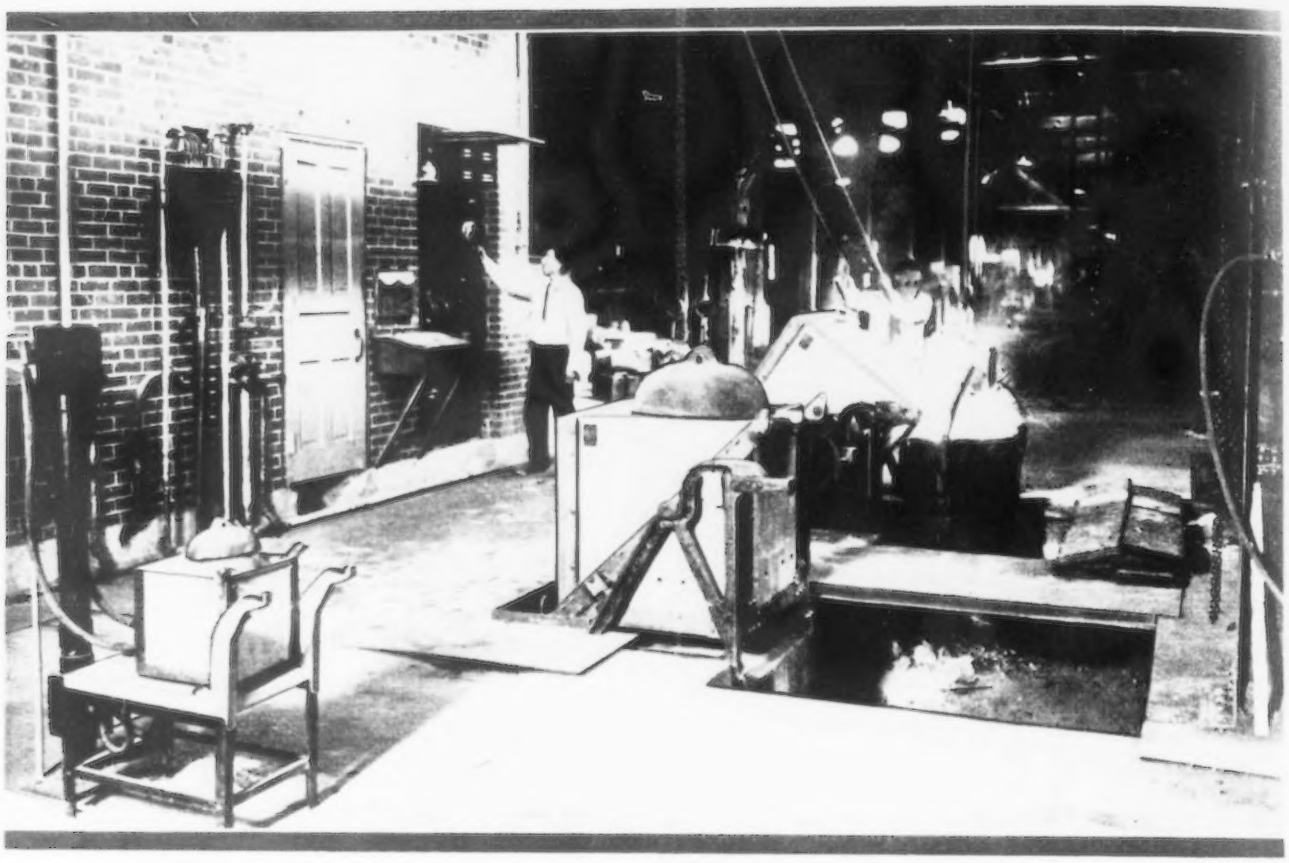


Fig. 14—A 1000-lb. high-frequency furnace pouring 1100 lb. of rustless steel.

holding power only, the metal may be maintained hot and, if desired, superheated. Since, however, high-frequency holding power only will be generally insufficient to produce the active stirring of the metal which may be required, a method has been developed and used for regulating the degree of stirring to any desired extent without affecting the heating.

This is accomplished by superimposing on the high-frequency current, which flows through the inductor and which accounts for most of the heating, a certain controllable amount of 60-cycle current. This latter current heats relatively little but is equally effective (for the same number of ampere turns in the coil) with high-frequency current for stirring the metal. Thus, with ample structural strength, movability, temperature regulation and independent regulation of stirring, we possess an admirable device for the refinding of metals upon a large scale.

Metals are sometimes merely superheated to secure certain metallurgical results. Thus, one-ton furnaces, previously referred to, are in use for super-heating molten cast iron poured from the cupola into the furnace at 2400 deg. Fahr. (1316 deg. C.) and then superheated without slag additions to 3000 deg. Fahr. (1649 deg. C.). This may be called a "refining" operation, but what is usually indicated by this term is when molten metal is covered with a slag to clean up sulphur, phosphorus and other impurities and for the removal of non-metallic inclusions.

For any impurity to be removed by slag, it must come in contact with it. By regulation of the stirring of the metal, we are able in a very short time to bring *all* the metal in the furnace ladle into intimate contact with the under-surface of the slag which is equally hot with the metal. In the stirring process, the metal rises rapidly along a vertical through the center of the mass, spreads out under the lower surface of the slag and then descends along the outer surface of the melt. It has been proved by the Bureau of Mines(c) at Pittsburgh that non-metallic inclusions, when they reach the slag, stick to it and are not returned to the metal by downward currents. Thus the metal is cleaned and far more rapidly than it would be if kept entirely quiescent until slag particles ascend to the surface as cream rises in milk. Chemical reactions of the slag on impurities are also made very rapid, because in a short time all the metal, due to rapid stirring, will have come into contact with the hot under-surface of the slag.

It has been proposed by Dr. Heinz Neuhauss, formerly metallurgist for Ajax Electrothermic Corpn., that reduction of the carbon content in chrome steel can be brought about by simply blowing hot air on the surface of the bath while the metal is being violently stirred. The idea is, so to speak, to bring all the metal to the air instead of blowing air through the metal—the reverse of the Bessemer process. Dr. Neuhauss made in this way from chrome steel, high in carbon, excellent rustless steel, soft enough so that it was rolled into sheets and drawn into tubes. The writer has no wish to express an opinion on the commercial usefulness of this method of refining, and he mentions it here chiefly as an incident of the extreme flexibility of the coreless induction furnace.

(c)See Technical Publication No. 88, by Herty and Gaines, American Institute of Mining and Metallurgical Engineers, 1928.

With such opportunities for refining of steel, it is natural to make the inquiry: Why not pour all Bessemer steel directly into a high-frequency furnace ladle large enough to take the whole Bessemer charge and then with lime slag rapidly remove sulphur and phosphorus? It is supposed that the ingots would then be poured directly from the refining furnace and that they would be clear and free from surface defects (if mold conditions were proper) so that the finished product could be fabricated directly from the ingot, thereby eliminating chipping and handling costs.

A Glance Into the Future of Industrial Melting

By high-frequency induction, anything which has moderate electrical conductivity may be heated with good efficiency. The field for its use is very extensive, but we shall confine ourselves here to that employment of high frequency induction by the coreless method (no core of transformer iron being used) where metals are melted and refined in commercial quantities.

For any method or structural device to become used more and more as industry advances, the method or device must meet the following conditions:

a. It must be basically and scientifically sound.
b. It must not be replaceable by something practically more simple, less expensive and more efficient.
c. In the normal advance of commercial requirements, a use for the method or device will be increasingly demanded.

Improvements in design and structure of any apparatus which depends upon a certain principle for its function are certain to go on; but if the principle used is basic and scientifically correct, these improvements will all revolve around the fundamental principle employed.

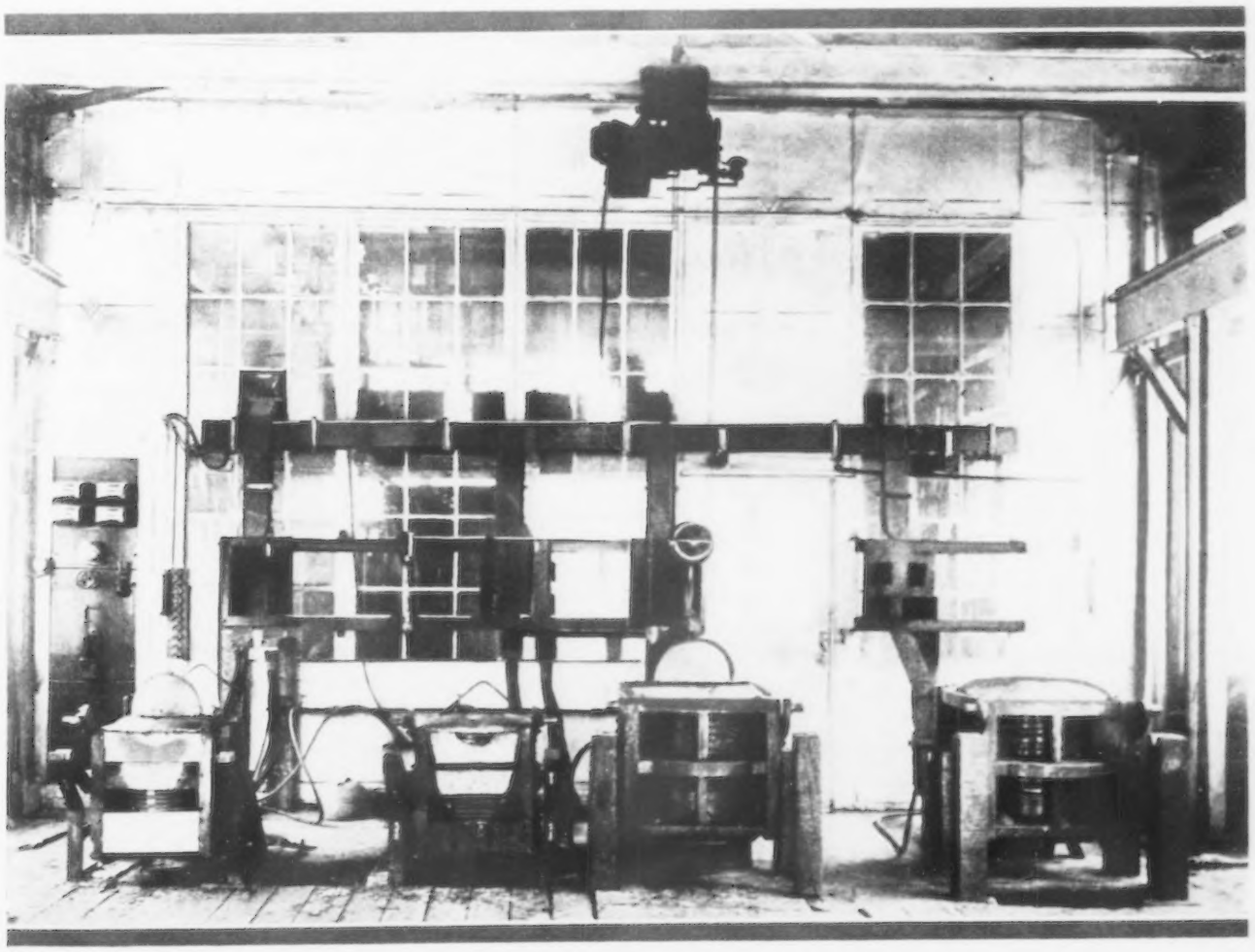
We have entered a new era in ferrous metallurgy. The objectionable features, the uncertainties and temperamental behavior of steel and the iron alloys of yesterday are being rapidly removed. The demand has arisen and has been largely met for:

a. Pure carbon-free iron and its alloys which possess high magnetic permeability at low magnetizing force.
b. Alloy steels of accurately controlled carbon content for magnet steel of great retentivity.
c. Non-corrodible rustless or stainless steels, some of which are quite carbon-free to give deep drawing qualities and others, with controlled carbon, that are hard stainless steels suitable for cutting and structural qualities.
d. Rustless steel castings.
e. Stainless ferrous alloys that are non-magnetic.
f. Tool or cutting steels of uniform and superior qualities.

The time has arrived when a melting tool is insistently demanded which will permit a control of the

(Concluded on page 447)

Fig. 15—Furnaces used by Babcock & Wilcox for making steel castings.



Fatigue Strength and Hardness of Nitrided Steels

SOME endurance tests made on nitrided steels, using a four-point loading rotating beam machine, type C. Schenck, Darmstadt, Germany, are reported by O. Hengstenberg and R. Maihaender in *Zeitschrift des Vereins deutscher Ingenieure*, Aug. 9, 1930, page 1127. The investigation covered six steels, different in composition and heat treatment, as given in Table I. Each one of these steels was tested after the following treatments:

a. Heat treated
b. Heat treated and annealed 48 hr. at 500 deg. C.
c. Heat treated and nitrided 48 hr. at 500 deg. C.

All specimens were polished; the ones of group c were polished before nitriding, without any additional finish after the nitriding process.

TABLE I—Composition and Treatment of Specimens

Specimen	C %	Si %	Mn %	Cr %	Al %	Ni %	Mo %	Heat Treatment, Deg. C.	
F P 15	0.30	0.43	0.41	1.43	1.12	—	—	920, oil	650, air
F P 13	0.52	0.14	0.27	1.74	1.28	—	—	900, oil	650, air
F P 13a	0.52	0.14	0.27	1.74	1.28	—	—	880, oil	670, air
F P K 13	0.32	0.22	0.72	1.24	.93	—	0.34	840, water	600, air
F P E 23	0.42	0.19	0.38	1.68	1.33	2.65	—	870, oil	660, air
F K 345	0.15	0.25	0.4	0.85	—	—	0.41	930, oil	650, air

TABLE II—Results of Rotating Beam Fatigue Tests

Specimen	Condition	Fatigue Limit* lb. per Sq. In.	Ratio of Fatigue Limit to Tensile Strength	Ratio of Fatigue Limit to T. S. × Yield Point
F P 15	a	59,500	0.52	0.29
	b	56,800-58,200	0.51	0.28
	c	78,000	0.66	0.36
F P 13	a	70,900-71,300	0.53	0.29
	b	73,800	0.50	0.28
	c	95,000	0.62	—
F P 13a	a	65,300-66,700	0.50	0.28
	c	83,700	0.63	0.35
F P K 13	a	68,100-69,500	0.53	0.29
	c	87,800-89,300	0.62	0.34
F P E 23	a	78,000	0.50	0.27
	c	96,400	0.57	—
F K 345	a	61,000	0.55	0.29
	b	65,300-66,700	0.59	0.32
	c	95,000-96,400	0.90	—

*The fatigue limits given are the stresses withstood for 5,000,000 cycles without failure.

The results of the fatigue tests are listed in Table II. In this table the fatigue limit is understood to represent that stress which will be withstood for at least 5,000,000 cycles without failure.

The investigators draw the following conclusions from their tests:

1. Nitriding raises considerably the fatigue limit of steels which show a normal fatigue limit when not nitrided.

2. The increase of fatigue strength depends on the kind of steel and, to a great extent, also on the thicknesses of the nitrided zone and the core.

3. The fatigue failure in nitrided specimens always starts from an internal point, located at the core near the nitrided zone, although this zone does not show plastic deformability in opposition to the core (a).

It was also found that small surface damage does not impair the fatigue strength of nitrided specimens.

The results are remarkable, as the tensile strength of the specimens is not increased appreciably by nitriding. This may be seen from the last two columns in Table II. On the other hand, nitriding causes a great loss of static ductility, as the elongation and the reduction of area are much reduced, e.g., in steel F P E 23 from 17.3 per cent and 53.5 per cent to nothing and 1 per cent. Apparently, this effect of nitriding on the tensile properties is not at all dangerous in the fatigue stress range (b), which in most cases is the one utilized in service.

Among the static tests made by the authors on the above steels, the hardness measurements deserve spe-

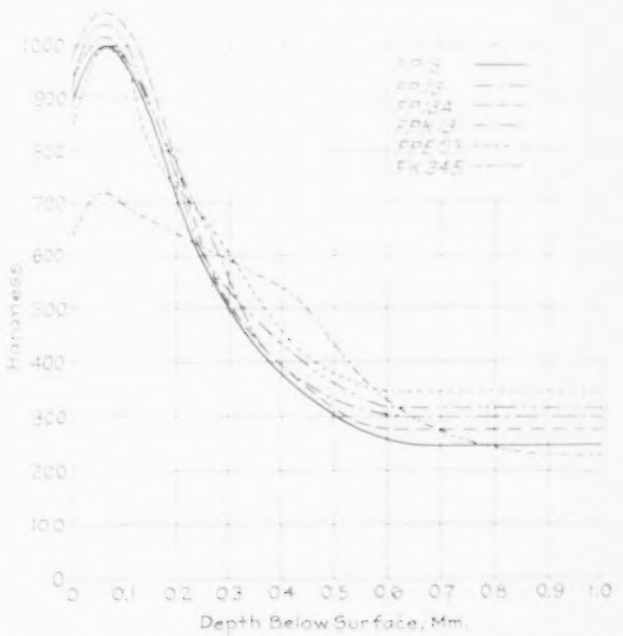
(a) This characteristic of internal cracks started by fatigue failure, recalls the behavior of steel specimens with a cold-rolled surface. (THE IRON AGE, Sept. 18, 1930, pages 775 and 829). The same cracks have frequently been observed in rails, where the wheels produce a distinctive cold rolling effect on the surface.

(b) The slight importance of the static ductility, measured by elongation in tensile tests, as to fatigue, has been emphasized in THE IRON AGE, Oct. 2, 1930, page 928.

▲ ▲ ▲

NITRIDING raises the fatigue limit considerably in steels showing a normal fatigue limit when not nitrided. The extent of the increase depends on the kind of steel and also on the thickness of the nitrided zone and the core. Failure in a nitrided specimen, due to fatigue, always starts from an internal point, located at the core near the nitrided zone. This abstract from the German is furnished by Dr. G. S. von Heydekampf, Southwark Foundry & Machine Co., Philadelphia.

▼ ▼ ▼



Hardness of nitrided steels tested by the Firth Hardometer (according to O. Hengstenberg and R. Mailaender)

ual mention. The testing apparatus used was the Firth Hardometer. Small square specimens were prepared by cutting and grinding them under an angle of 30 deg. to the long axis. The hardness readings were taken on the oblique face at distances of 1 mm. The hardness—depth curves in the chart—are essentially the same as the diagram of Bierbaum, published in THE IRON AGE, Oct. 23, 1930, page 1143. Here, too, the maximum hardness is shown not to be at the surface, but somewhat below it, so that the Firth Hardometer seems to be as nearly accurate an instrument as the Bierbaum microtester, described in the article noted.

It is interesting that steel F K 345 is not as hard as the rest of the steels tested. The nitrided zone, however, is thicker, resulting in the exceptionally high increase of fatigue strength gained by nitriding this steel.

Modern Forging Facilities

(Concluded from page 386)

The company maintains an engineering department and designing room in which new products and wrenches of improved design are developed, constant attention being given to the improvement of the design of tools, and the company brings out on an average of one new tool a month.

Growth in the volume of business making expansion necessary, the company five years ago acquired a new 35-acre factory site and on this its development has taken place. Starting with a small building housing two drop hammers half a century ago the company's forging equipment now consists of 18 steam hammers ranging in size from 1000 to 8000 lb., 11 board hammers from 800 to 2500 lb. and eight forging machines in sizes of from 1 to 5 in. inclusive.

The plant occupies five buildings: a main building 60 ft. x 740 ft., which is occupied by the cold trimming, grinding, heat treating, enameling and baking and shipping in some other departments; a machine shop and die department 80 x 200 ft., these two buildings being of brick and steel construction; a forge shop 80 x 260 ft. of all-steel construction; a concrete block and steel building 30 x 110 ft. in which are located miscellaneous small departments, lockers, showers and wash room and a boiler house in which are two 500-hp. boilers with modern stoker equipment.

The present officers of the company are: Stanley S. Boyer, president and general manager; Richard O. Mead, vice-president, and C. Traube Gottron, secretary and treasurer.

Continuous Enameling

(Concluded from page 379)

dipped and the two finish coats are sprayed on the inside of the cabinet only.

The liners are fired in continuous-type furnaces and are hung on racks from eyes which are welded on the edges of the liner for this purpose. Door liners of various sizes are also fired in the same furnaces.

The large-size evaporators for commercial refrigerators are enameled at the Fort Wayne plant. These, too, are fired in continuous furnaces, the general construction of which is the same as for those mentioned above, except for a horizontal drying oven which is added to the front end of the furnace at the foot of the inclined preheating chamber.

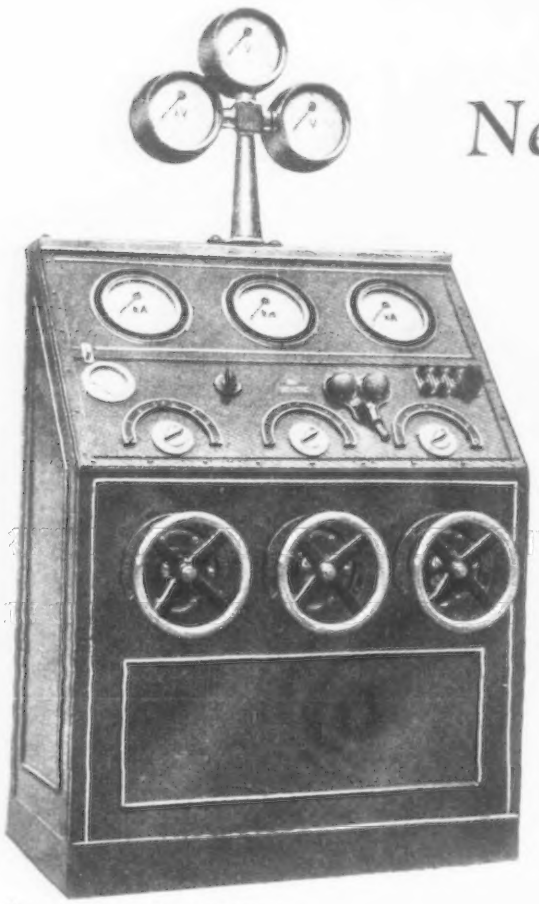


Fig. 1.—General arrangement of the regulator in connection with an electric furnace and measuring instruments

New Magnetic Hydraulic Electrode Regulator for Arc Furnaces

By C. CLIFFORD LOEB

TAGLIAFERRI, who has constructed some of the largest electric furnace installations in Europe, has recently patented in the United States—Aug. 26, 1930—a new electrode regulator for arc furnaces. Over 40 installations of this regulator have already been made in Europe.

Up to the present, one of the difficulties in electric furnace practice has been the extreme peaks in the current load while operating. Mr. Tagliaferri has devised a regulator relatively simple in construction, which keeps the load within small limits, not only during the melting of the charge, but also during the charging of the furnace, even with cold scrap.

For a three-phase furnace, the equipment consists of the following:

One motor pump for the hydraulic pressure.
One automatic regulator, complete with manual control, measuring and control instruments.
Three hydraulic plungers directly coupled to the electrode holders.

The control consists, for each electrode in its three principal parts, of the following:

One three-way hydraulic valve.
One manual control device.
One automatic control device, equipped with oil servo-motor, influenced by an electro-magnet.

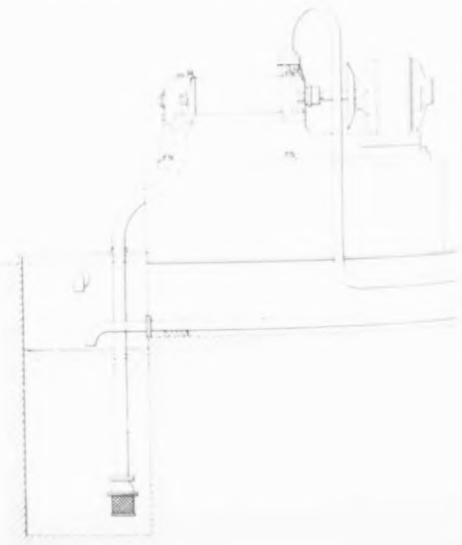
In Fig. 1 is illustrated a general arrangement of the regulator in connection with an electric furnace together with measuring instruments. Fig. 2 is a drawing of the whole device necessary for a three-phase furnace. Fig. 3 represents the complete equipment necessary for a three-phase furnace, together with hand control apparatus.

The regulator provides a means by which quick and safe control is obtained and by which the automatic regulation is entirely independent of the manual control, yet can be simultaneous with it. The intervention of the regulator is practically instantaneous—in about one-seventh of a second.

The regulator, self-contained in a duralumin casing to which is attached the motor of the oil pump, consists of three essential parts for each phase —an electromagnet whose movable armature, connected with the secondary of the transformer feeding the furnace, is suspended on a steel pivot resting on a hard semi-precious stone base; the differential piston or servo-motor proper, which changes the circular motion of the magnet to a vertical motion and multiplies the force of this movement; the hydraulic piston valve distributer which regulates the water pressure necessary to move the electrodes.

The manual control is so devised that, while the automatic control is in action, it cannot be used to lower the electrodes but only to lift them, therefore rendering the apparatus foolproof. The specially designed motor and oil pump form an integral part of the aluminum container, making it very compact in construction.

The distributing device for water under pressure, or main servo-motor, comprises a cylinder within which



moves a vertical piston. Moving the lever by hand displaces the piston through the stirrup and cam. In the position indicated in the drawing, the distributing disk is in its extreme upper position, so that the water entering through the pipe, into the hydraulic cylinder, lifts the piston and the electrode. The rotation of the cam lowers the vertical piston under the pressure of the springs, till the distributing disk closes the inlet, whereby the electrodes become stationary. Further rotation of the cam moves the vertical piston farther down, whereupon the inlet comes into communication with the discharge pipe, through the chamber.

The piston descends under the weight of the electrode and the electrode holder, and the water passes to the discharge pipe. The differential piston firmly connects with the vertical hydraulic piston.

The head of the differential piston within the cylinder has a number of axially extending parts, each of which communicates through a small radially directed hole with a chamber in the head of the differential piston. Within this piston head is arranged the distributing valve of the auxiliary distributing system, which rotates through a small angle. Upon the bracket, attached to the container by a resilient bearing, is fastened the valve of special construction.

When initially adjusting the device, the rotation of the piston within the cylinder adds sensitiveness to the regulation, due to the wedge-shaped construction of the disk. The manual regulation is simply effected by moving the lever to and fro. On the shaft of the valve is arranged the movable armature of the electromagnet, the stationary armature of which is fixed to the container. The winding of the magnet connects with the secondary of the transformer; the primary of the transformer is series-connected with the phase conductor leading from the transformer to the electrode.

Within the valve body are arranged four vertical slots which, in a given position, register with one of the radial holes in the differential piston. At the lower end of the cylinder bore there is an opening communicating with the oil tank through a pipe. This tank connects with the oil pump operated by the motor. In this tank there is sufficient pressure to compensate eventual fluctuations in pressure and to allow the differential piston to be raised, should the oil pump stop, whereby the servo-motor lifts the electrodes.

If the vertical slots of the valve register with the radial holes in the differential piston head, the oil from the pump, which can be regulated initially by a cock to regulate the speed flows into the interior of the container. By means of this communication, no oil pressure can arise in the chamber; the spring forces the differential piston into its lowest position.

However, when the automatic control is to be used, the lever of the manual regulator has to be pulled backward. The pipe in the container is of such height that the whole apparatus is permanently covered by oil. To prevent the violent rotation of the magnet armature, the shaft is provided with blades which, moving in the oil, exert a damping effect. By rotating the valve through a small angle, the ribs are brought into such a position that they close the radial holes in the differential piston. The oil inlet is thus closed; the oil is collected in the chamber and presses on the head of the differential piston. This overcomes the force of the springs; the piston lifts sufficiently to push against the stops limiting its extreme upper position.

The rotation of the valve, firmly connected with the movable armature of the electromagnet, is produced by the variation in the intensity of the magnetic force in the armature. This flux density is proportional to the strength of the current in the conductor leading from the transformer to the furnace. There are two helical springs symmetrically arranged with respect to the axis of the movable armature and, at the other end, with

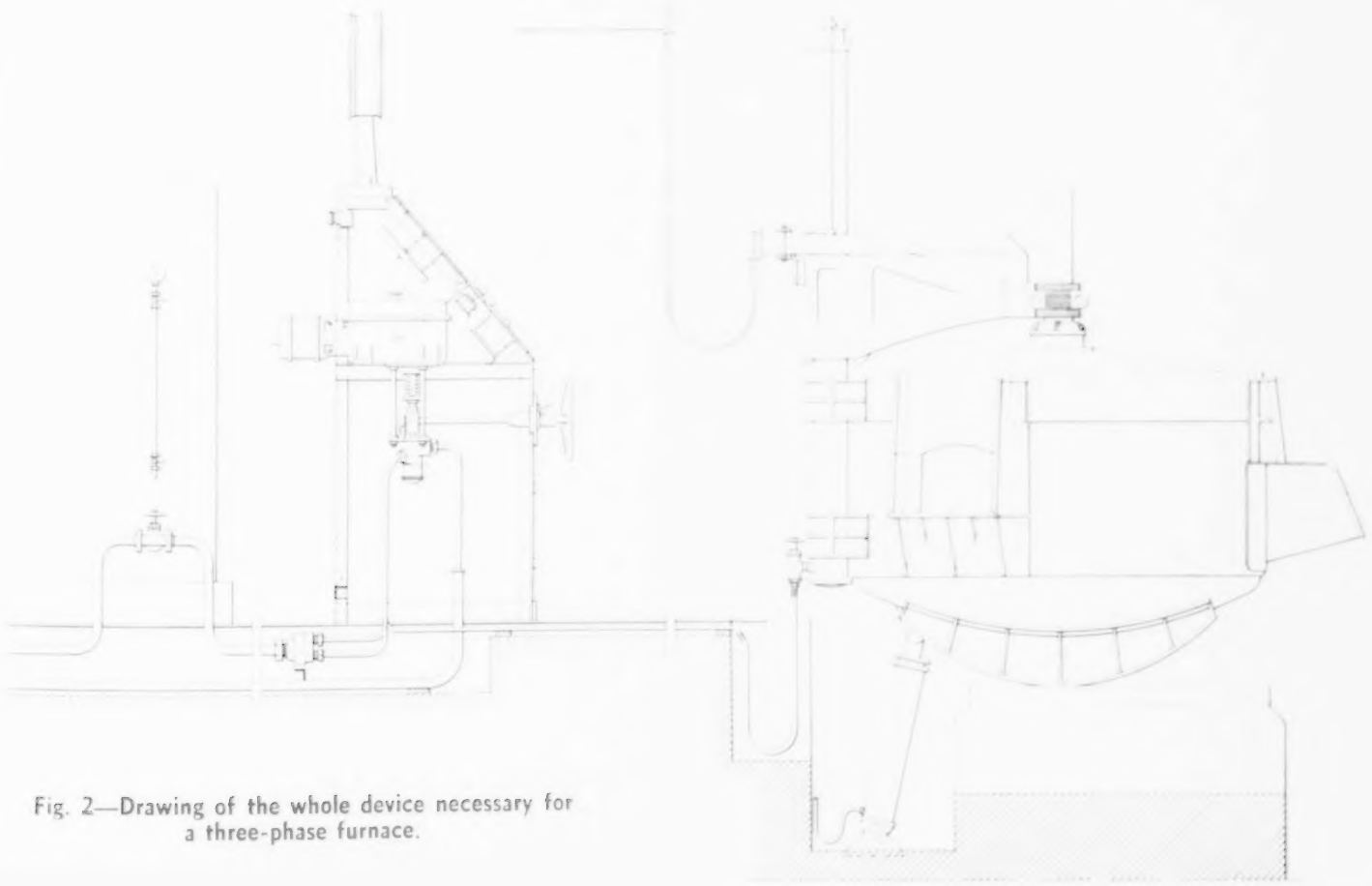


Fig. 2—Drawing of the whole device necessary for a three-phase furnace.

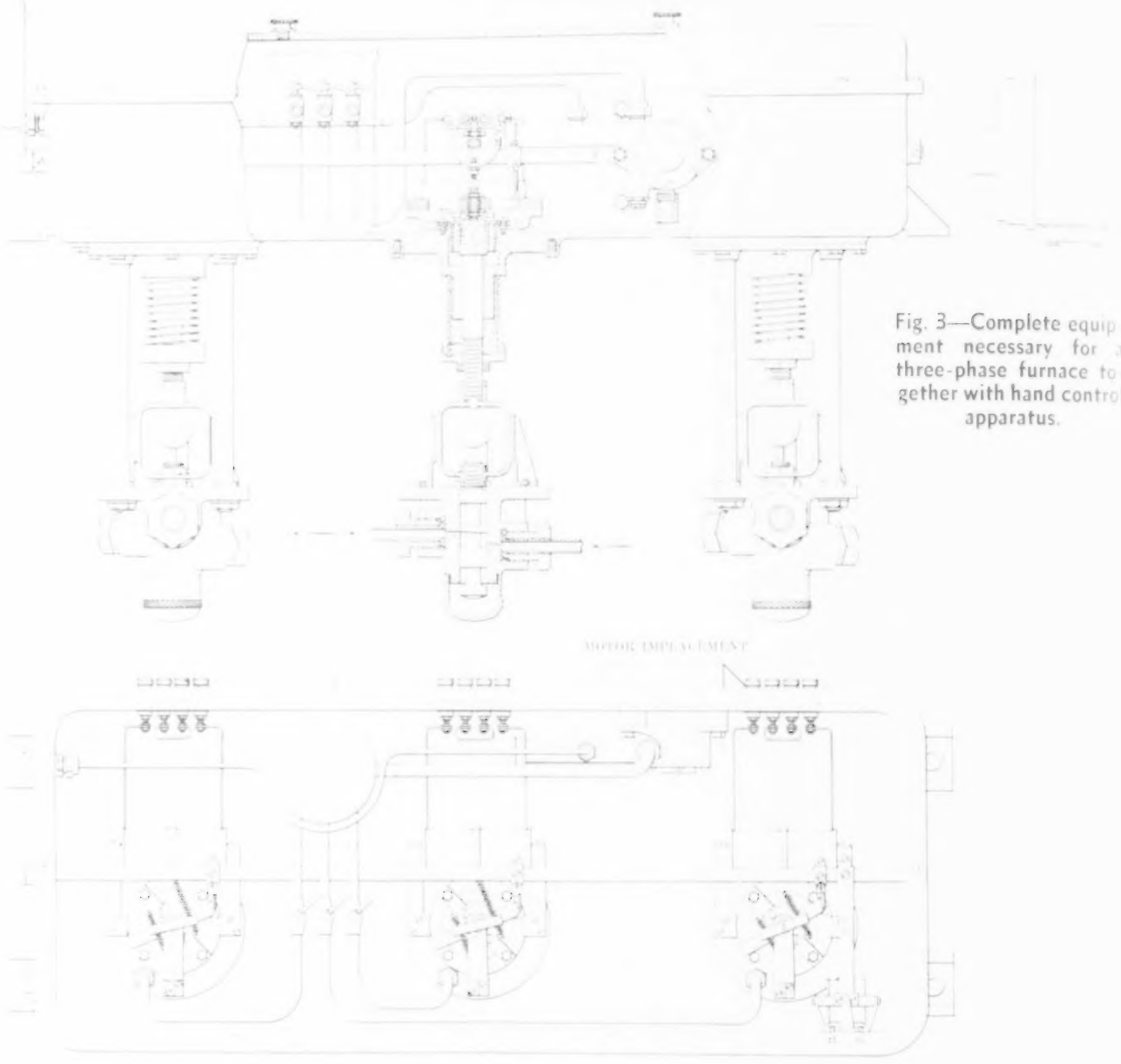


Fig. 3—Complete equipment necessary for a three-phase furnace together with hand control apparatus.

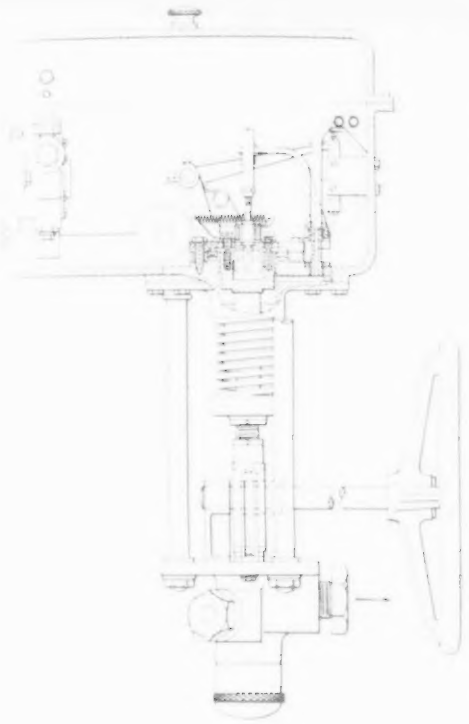
a bell-crank lever which has its fulcrum upon the bracket, the shorter arm of which bears against the upper surface of the differential piston. The object of this lever arrangement is to hold the movable armature against the end of the lever and also control the hunting oscillations of the magnet.

When the furnace is disconnected, under the influence of the opposing springs, the movable armature bears against the end of the lever fastened to the shaft supported on the container.

On this shaft is also fastened a lever on the end of which is the movable armature forming part of the electromagnet, whose winding is connected across the supply conductors of the furnace. If the installation should remain without current, it would be necessary that the electrodes lift from the bath. In this case the armature separates from the magnet and provokes the movement of the lever, allows the armature to be displaced, and closes the oil inlet. In this position of the armature the slots of the valve do not register with the radial holes in the differential piston and the armature bears against the end of the lever. By starting the pump oil pressure is produced in the chamber which lifts the differential piston and consequently the vertical piston of the servo-motor.

When the furnace is started, the movable armature is attracted by the electromagnet; the lever displaces the armature so that the slots register with the radial holes; the piston descends and with it the electrode, until the latter touches the bath. The electromagnet is now energized. The movable armature and the valve will rotate under the influence of the magnetic attraction. In this position of the movable armature, the slots in the valve do not register with the radial holes in the differential piston head; oil pressure is again produced in the chamber, whereby water pressure is admitted, lifting the cylinders and the electrodes and striking the arc. The rising of the electrodes continues; the length and resistance of the arc increases; the current strength decreases, causing the movable armature to return to its original position under the influence of the springs.

During the practical operation of the furnace, a certain state of equilibrium is established between the current strength and the position of the armature. The vertical piston, therefore, moves very slightly from its normal position and rarely reaches its extreme positions. In the extreme positions the action of the regulator is very rapid. A regulating resistance is parallel-connected with the winding of the electromagnet, in order to regulate the current strength within the wide limits on which the



regulator is to work, for instance from 2000 to 15,000 amp.

The regulator is usually adjusted to action in about one-seventh of a second, when the current variations are over 1 per cent, more or less, than the average working current capacity. On the side of the container is placed a lever which raises the three electrodes simultaneously and which is used for slagging. When slagging operations are finished, by returning the lever to its original position, the electrodes descend and strike the arc.

Having no exposed parts, the regulator, together with the control and measuring instruments, can be placed near the furnace and under continuous control of the melter.

A report on employees' magazines published by the Policyholders' Service Bureau of the Metropolitan Life Insurance Co., New York, is based on a study of more than 200 such publications received each month by the bureau. In addition, material was obtained from standard reference books by recognized authorities. The scope of the strictly internal house organ is shown by quoting a survey by Barron G. Collier, which found that 176 employees' magazines had a combined monthly circulation of 1,237,145, or an average circulation of 7030 each at an approximate cost per copy of 11.1c.

Link-Belt, Ltd., Toronto, Montreal and Vancouver, Canada, announces the following appointments of sales representatives in the Prairie Provinces: Manitoba and Saskatchewan will be represented by Manitoba Bridge & Iron Works; Winnipeg and Southern Alberta will be represented by Riverside Iron Works, Ltd., Calgary.

Large Gain in Non-Ferrous Metal Production in 1929

Non-ferrous metals and products turned out by 1214 establishments in 1929 were valued at $892,205,561, according to the Bureau of the Census. This represents an increase of 60.6 per cent over the $555,535,727 reported by 1197 establishments in 1927. Production for each wage earner increased markedly, as the increase in number of wage earners, from 65,923 to 80,390, was only 21.9 per cent.

Principal among the items in 1929 are plates and sheets, $185,675,575; rods, $135,765,974; pipe and seamless tubing, $72,090,126, and rough castings, $95,745,119. These represent all of the non-ferrous and non-precious metals, with the exception of aluminum.

Expressed by weight, brass and bronze sheets and plates were made to the extent of 255,255 net tons. Copper plates and sheets amounted to 129,170 tons; lead, 34,520 tons; zinc, 8668 tons; nickel alloys, 27,162 tons; and other metals, 2419 tons.

Rods of brass and bronze totaled 170,228 tons; those of copper, 569,324 tons; nickel alloys, 8064 tons; and other non-ferrous metals, 3602 tons. Extruded shapes of brass and bronze made up 8817 tons, and those of other non-ferrous metals, 3748 tons.

Tubing of brass and bronze totaled 71,599 tons; that of copper, 49,031 tons; lead, 37,026 tons; nickel alloys, 555 tons; and of other non-ferrous metals, 3686 tons. Other tubing, including that brazed, was 7012 tons.

Abrasive Grain Simplified Practice Approved

Simplified practice recommendations covering allowable limits for the sizing of aluminum cable and silicon carbide abrasives for polishing uses and grinding wheel manufacture have been approved by the industry for publication as an effective program, according to an announcement of the division of simplified practice of the Bureau of Standards.

Adoption of this recommendation is expected to stimulate similar study of other kinds of abrasive grains and subsequent formulation of additional simplified practice recommendations in this field.

2514 Airplanes Made for Civil Use in 1930

Airplanes manufactured in the United States for civil use during the full year 1930 totaled 2514, according to a preliminary report by the Aeronautics Branch of the Department of Commerce.

The report is based on a record of Department of Commerce licenses, identifications and reports for aircraft manufactured since Jan. 1, 1930. There is a possibility, however, that of the aircraft manufactured during the year 1930 there still may be a few for which licenses or identification marks have not yet been sought, or that there may have been a few exports on which information has not yet been received.

In addition to 2514 aircraft manufactured for civil use, 710 military aircraft were delivered to the Army and Navy during the year, which places the total production at 3224. Of the aircraft manufactured for civil use during the year, 250 were exported.

Pressure Die Castings of Aluminum Bronze

A novel application of die casting practices has been developed by the Aurora Metal Co., Aurora, Ill. The company manufactures pressure die castings of aluminum bronze, which are cast at temperatures of about 2300 deg. Fahr.

On account of the uniform accuracy to which, it is claimed, these castings are made, they require a minimum of machining and, in many cases, no machining at all. The tensile strength of this material as cast is 85,000 lb. per sq. in. It has a hardness of Rockwell 66 B, Brinell 140. When quenched from 1700 deg. Fahr. the tensile strength is 100,000 lb. per sq. in., and the hardness 110 Rockwell B, 260 Brinell. Any desired hardness between these limits can be obtained by proper heat treatment.

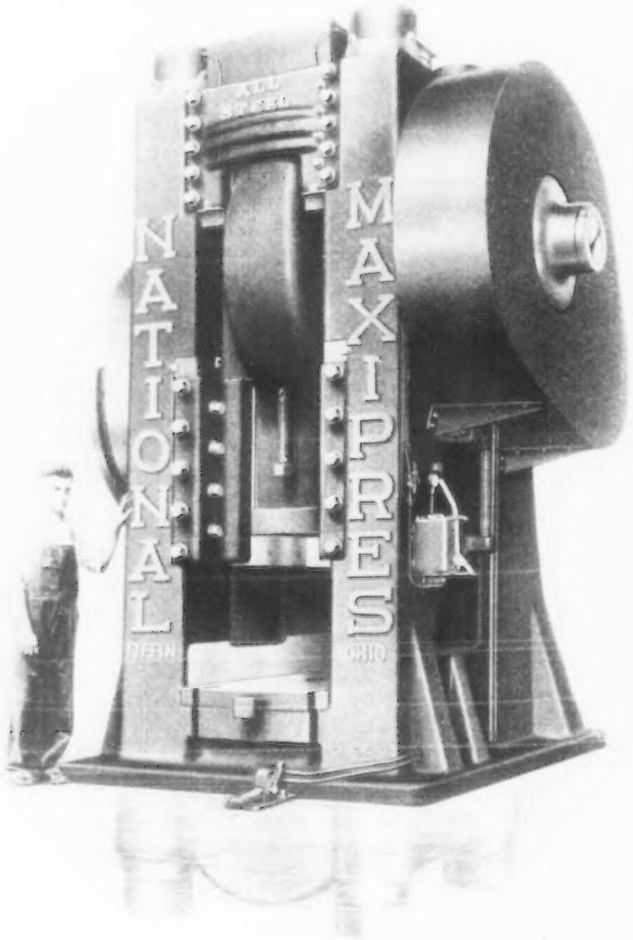
These die castings also have a high tensile strength at elevated temperatures. Die cast test bars showed the following results at temperatures indicated below:

Temperature, Deg. Fahr.	Tensile Strength, Lb. per Sq. In.
70	84,300
400	66,800
550	59,000
800	46,500
1000	33,000

The aluminum bronze having the above properties has the composition: 89 per cent copper, 10 per cent aluminum and 1 per cent iron. By making slight variations in the composition of the alloy, changes can be effected in the physical properties of the die castings to suit particular requirements.

The corrosion resistance of aluminum bronze, absence of aging changes, resistance to shock, and great tensile strength claimed for this material, should make its use advisable where any of these qualities would be advantageous.

Production by the machinery industry in Canada during 1929 reached a new high peak, with a value of $65,692,539, according to the annual bulletin of the Dominion Bureau of Statistics at Ottawa. This indicates a gain in output of $35,000,000, with an additional outlay of $20,000,000 capital in 1929 as against 1925.



HIGH-SPEED COINING PRESS DISPLAYS NEW FEATURES

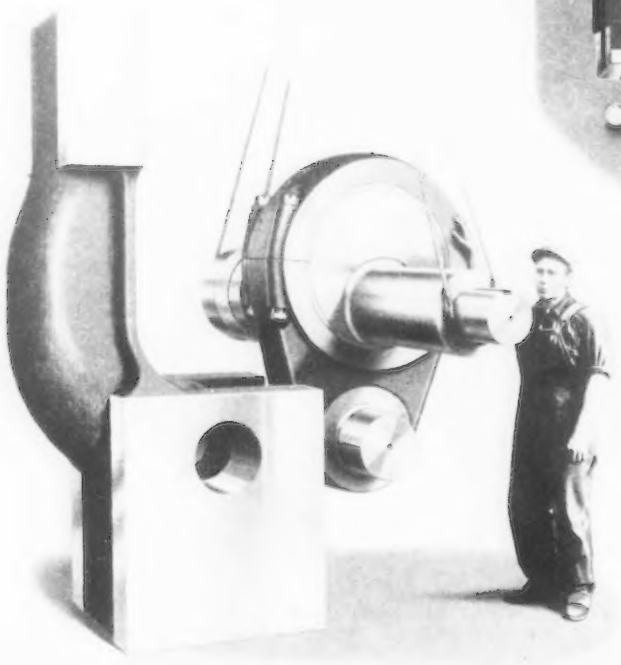
THE NATIONAL MACHINERY CO., Tiffin, Ohio, is placing on the market a new line of coining or finishing presses designed for high-speed coining, swaging or forming of parts hot, semi-hot or cold. These presses are made in eight sizes, varying in weight from 19,000 to 368,000 lb.

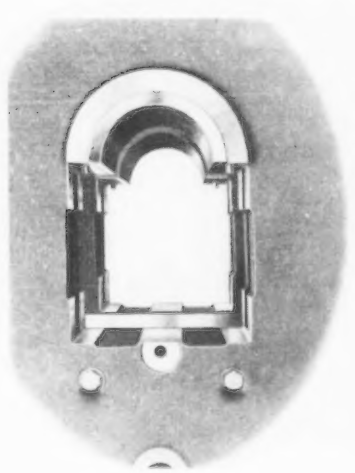
Aside from the features of design shown in the illustrations, may be mentioned a material shortening of the distance between die seat and main shaft due to the incorporation, in the "Maxipress," of the patented over-arm slide construction, developed by the company for their high-duty forging machines. The shortening of this distance results in a proportional increase of stiffness. This construction also permits a considerable increase in the slide length, giving ability to withstand off-center pressure.

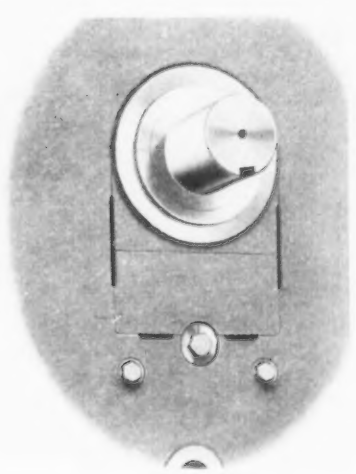
Operating control is provided through a quadruple abutment clutch and an air trip of similar design to those used on the company's forging machines. The flywheel is provided with friction slip, which protects the machine from damage. All slide-wearing surfaces are fitted with renewable wear plates.

▼ ▼ ▼

THE possibilities of cost reduction through "coining" or machining to size by pressure are emphasized by the National Machinery Co., Tiffin, Ohio, makers of the new National "Maxipress." In addition to the great pressures required to swage or form parts within the usual accuracy limits of machining, high operating speeds insure large output.







THE upper main bearings support the eccentric shaft directly next to the side faces of the eccentric, and close to the center line of the load. The lower half of the bearing housing is supported in the bed frame by a tapered wedge block, providing adjustment. There are but three bearings on the "Maxipress" between the source of power and its application.

THIS view of the eccentric shaft, pitman and over-arm ram of the "Maxipress" illustrates the measure of strength and rigidity which the makers have built into the machine. These parts are assembled in a one-piece cast steel frame. Four huge tension bars, shrunk into position, place the frame under an initial compression.

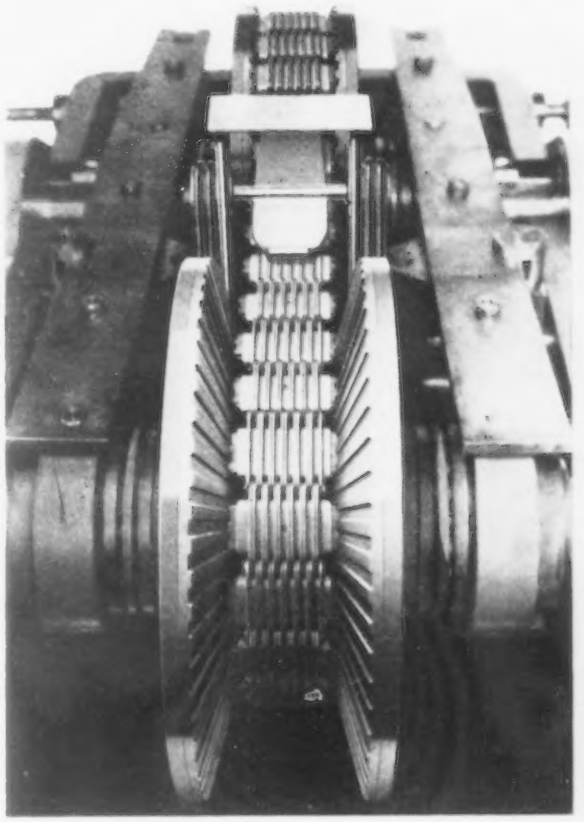
▼ ▼ ▼

All-Metal, Chain-Driven Variable-Speed Transmission

THE all-metal variable-speed transmission recently announced by the Link-Belt Co., Philadelphia, is called the P. I. V. gear, the initials standing for "Positive Infinitely Variable," indicating its characteristics.

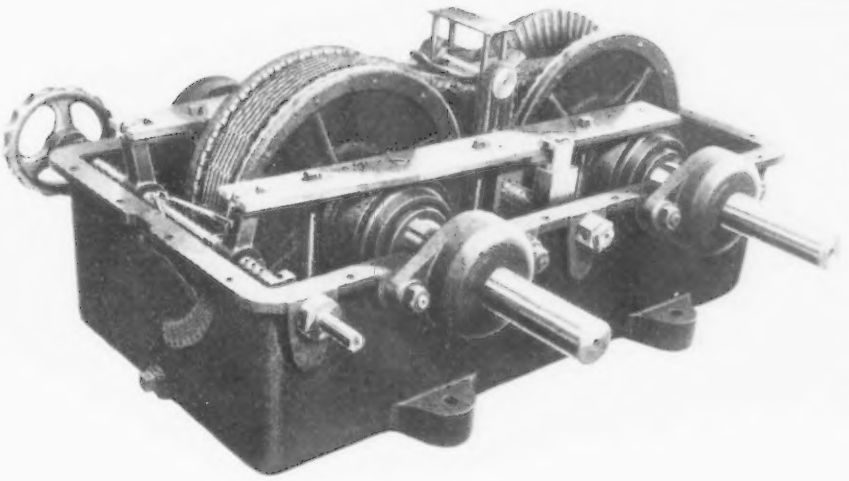
Basically, this new speed-change unit consists of two pairs of wheels of the opposed conical disk type, between which a special chain transmits power. The effective diameters of each pair of wheels can be altered under load to change the speed ratio, without steps and without dependence upon friction. On changing speed, the "self-pitching" chain rises between one set of wheels and descends between the other, so that, while the input shaft connected to a motor or other source of power turns at constant speed, the output shaft is brought to the desired r.p.m.

The original feature of the P. I. V. gear is its use of a positive chain drive to transmit the power. Radial teeth are cut in the conical faces of the driving disks, and the self-adjustable teeth projecting beyond the sides of the chain are arranged to engage positively with the radial teeth of the disks.



A POSITIVE chain is used to transmit power. Self-adjusting teeth carried in the chain mesh with radial teeth cut in the conical faces of the disks.

Effective diameters of each pair of wheels can be altered under load, by hand wheel at left. Tension device is at top, center.



Chain used in this unit consists of a series of steel leaves or links with joints of hardened steel pins turning in segmental bushings. There are no teeth on the inner surface of this chain. Instead, what may be called teeth are made up of packs of hardened steel laminations or slats, which extend through slots in the links at right angles to them, and project about ⅛ in. at each side of the chain.

The individual containers which hold the packs of slats are secured in the openings of the links, but, within each container, the slats are free to slide from side to side individually with relation to each other, and adjust themselves to engagement with the radial teeth of the disks, over substantially the full range of diameters. The angle of the slat ends, 30 deg., is the same as that of the conical faces of the wheels.

The teeth of the conical disks widen from the center outward, but are of uniform depth. They are so staggered relatively on each pair of wheels that the slats move back and forth into the teeth to mesh correctly as the chain comes into contact with the wheels.

All elements of the transmission are built into and protected by a compact oil-tight housing, and are automatically splash lubricated. The hardened steel wheel faces are mounted on cast-iron hubs backed by ball thrust bearings, and move axially on the shafts, which in turn are mounted in radial ball bearings. Movement of the two wheels in a pair, together or apart, to increase or decrease their effective pitch diameters, is controlled by a pair of pivoted levers operated through a hand-control shaft with right and left-hand screw motion.

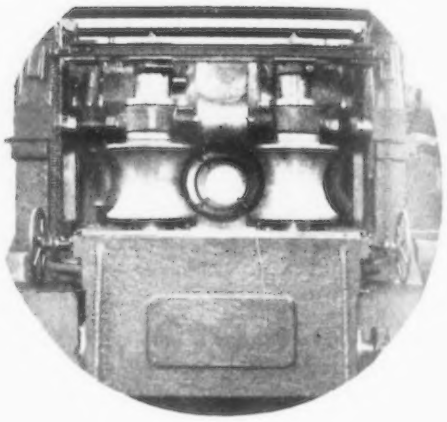
Initial chain tension is provided for by an external adjustment screw, and correct operating tension is maintained, at all ratio settings, by two hardened shoes which ride lightly on both upper and lower strands of the chain, under constant spring pressure. A speed indicator permits ready check-up on operating speed settings.

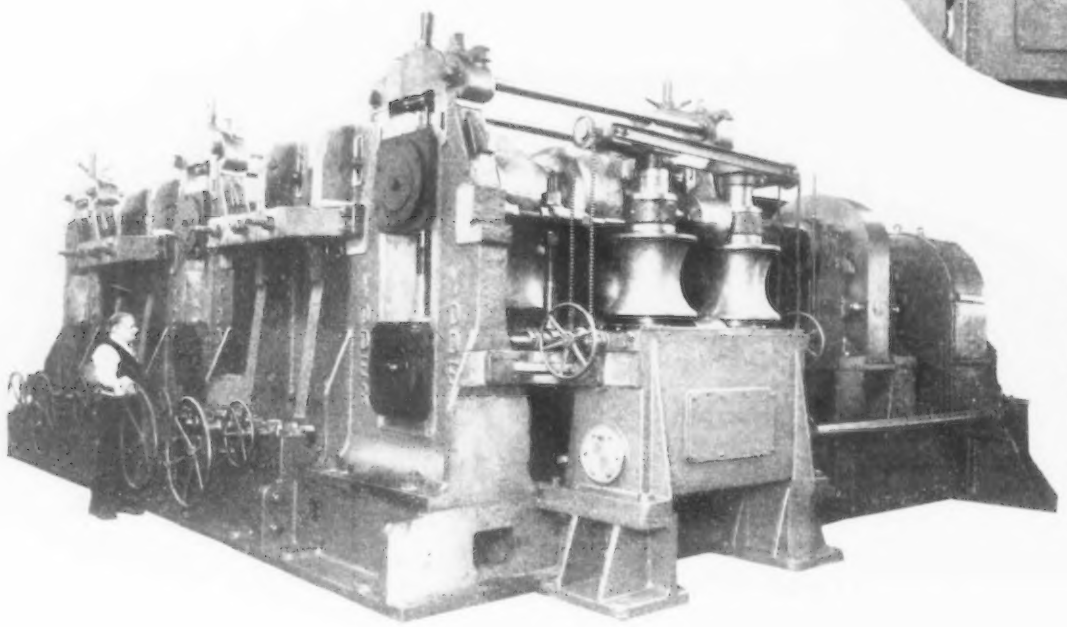
This transmission unit may be had in five sizes, from 1 to 10-hp. capacity, and in speed-change ratios up to a maximum of six to one.

A new inhibitor for use in metal pickling, to prevent over pickling and to reduce acid consumption, has been brought out by the Grasselli Chemical Co., Inc., Cleveland. The inhibitor is manufactured in two grades, both in the form of a brownish powder. The No. 1 grade is non-foaming and the No. 2 grade, in addition to inhibiting, produces a foam blanket on the surface of the pickling solution which acts as a filter and condenser for any gas or vapors that may develop.

Austin Co., Cleveland, has opened a new district office in Boston at 86 First National Bank Building, in charge of A. D. Engle, formerly sales engineer in the New York office.

Designs Machine for Sizing and Straightening Welded Pipe





ELECTRICALLY-WELDED pipe is sized and at the same time straightened by passing it through a series of nine stands of rolls. The range is for pipe from 16 to 26 in. in diameter, $\frac{1}{2}$-in. or less in thickness.

IN the manufacture of electrically-welded pipe an important problem is the sizing and straightening of the pipe after welding. A machine for reducing the pipe to size and at the same time straightening it by passing it through a series of rolls has been brought out by the Yoder Co., Cleveland.

This is a massive machine 34 ft. long, 30 ft. wide, 13 ft. high and weighing approximately 450 tons. The pipe passes through a series of nine stands of rolls, each stand being made up of a cluster of two vertical and two horizontal rolls. The rolls are curved to fit the contour of the pipe which is virtually completely encircled by the four rolls. One stand of guiding rolls is located at the loading end. Then come three sets of main driving rolls which serve as sizing stands and after these there are four straightening stands and one final straightening stand. The vertical rolls on the guiding stand and final finishing stand and the horizontal rolls on the sizing stands are driven and furnish the propelling power. The remaining rolls are idlers. The pipe is delivered into the machine over a roller table and is discharged onto a similar table.

Horizontal rolls of the main or sizing stands are driven by three 60-hp. variable-speed motors, one for each set of rolls. The drive is through a herringbone gear speed reducer. Drive for the vertical rolls of the guiding and final finishing stands is from the main stands through sprocket chain to a shaft and double gear.

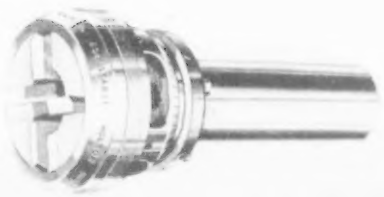
Each set of straightening rolls is adjustable by means of hand-wheels on each side of the machine, the adjustment being made by raising or lowering the housing in which each cluster of rolls is separately mounted. These wheels are provided with micrometer adjustments. Starting and stopping are controlled by push button.

The frame of the machine is made of steel castings. The sizing reducing rolls are alloy steel forgings, hardened and ground, and the other rolls are of special alloy castings. Anti-friction bearings are used throughout, and lubrication of all the bearings is by force feed. The machine is designed to straighten pipe from 16 to 26 in. in diameter inclusive and in any gage up to $\frac{1}{2}$ in. thickness and of steel ranging in hardness up to 0.50 per cent carbon and to reduce the circumference $\frac{1}{4}$ in. or sufficient to take out flat spots and other irregularities. It is stated that it will straighten a section of pipe 50 ft. long within $\frac{1}{8}$ in. limits.

The Yoder Co. also will make a machine of the same design for straightening and sizing pipe of wide diameter range, from small to very large.

Hollow Mill Equipped with Adjustable Blades

AN adjustable inserted blade hollow mill designed to increase production in machining bar stock, castings and forgings has been developed by the Gairing Tool Co., Detroit. It is a combination tool for hollow milling and facing, and is made rigid for heavy-duty work as well as light, accurate cuts.



Adjustment of the blades is effected simply by rotating the cone-shaped external nut which has direct bearing on the outer edge of the blades. This nut is graduated in thousandths to facilitate setting to the required diameter. The blades have a positive lock secured firmly in the body and are of such construction that tilting is impossible. They are interchangeable and new blades may be inserted when

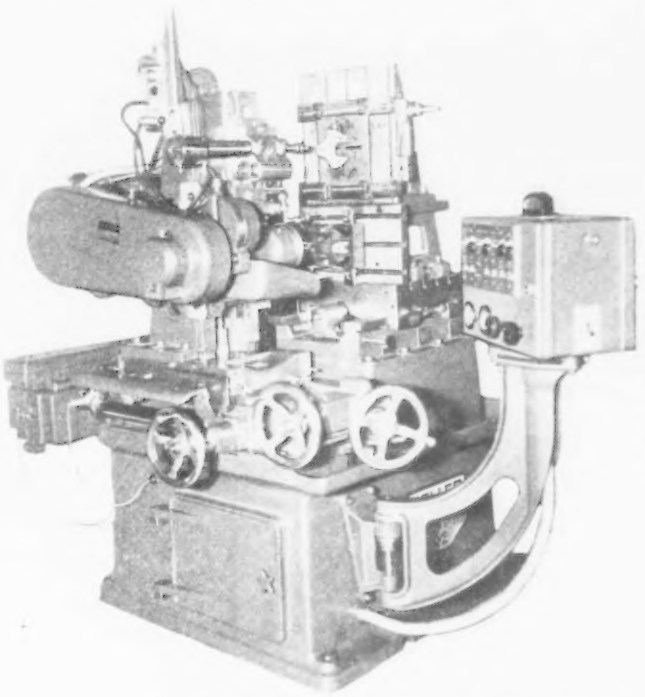
original sets are worn out from continuous grinding. Bodies are case hardened to assure long life.

Accuracy of blade setting with the refinements in design permit use of Stellite or cemented tungsten carbide metal blades, although high-speed steel blades with decarbonized surfaces removed are standard. Correct cutting angles and proper spacing of blades for different kinds of metal have been incorporated, so that the tool will be applicable for straight or taper surfaces and facing operations. Blades can be formed or ground to any angle. The body of the mill can be made for taking multiple cuts, or it can be equipped with drills, reamers or multiple operation cutters. Pilots can be inserted.

Small Keller Automatic Tool-Room Machines

A SMALL automatic tool-room machine for a wide variety of die and tool work up to 12 x 10 in. is being announced by the Keller Mechanical Engineering Corpn., 70 Washington Street, New York. Two types of the machine are made, one being designated as the G-1210 and the other as the GG-1210; they are identical except that the GG-1210 has a built-in jig boring device to permit machining, locating, drilling and boring to utmost precision at one setting.

The machines are designed for rapid and economical, as well as accurate, production of trimming, blanking, extrusion and other dies; also molds, cams, punches and a wide variety of odd-shaped pieces that can be milled from templates. They employ the same principles used in the larger BL and BG Keller machines. With a massiveness that permits taking heavy hogging cuts, the small machines are said to combine a sensitiveness, through an intermittent feed, that permits effective use of mills as small as 0.042 in. in diameter. Another feature is the wide range of spindle speeds, from 225 to 3500 r.p.m., which may be increased further to 10,000 r.p.m. by means of the "super" high-speed spindle unit designed for these machines. As in the larger Keller machines, the cutter spindle is guided by simple electrical control from the tracer, following the contour of a template. Except for occasional manipulation of the tracer controlling to give the machine its directional bias, all contour operation is automatic.



RUGGEDNESS to take heavy hogging cuts, together with sensitiveness that permits effective use of mills as small as 0.042 in. in diameter, is an outstanding feature. One model incorporates power transverse feed and other facilities for jig boring.

Adaptability of these machines for economical cutting of flanged punches, use of which has been restricted largely because of the expense of producing them, doubtless will be of interest to makers of blanking dies.

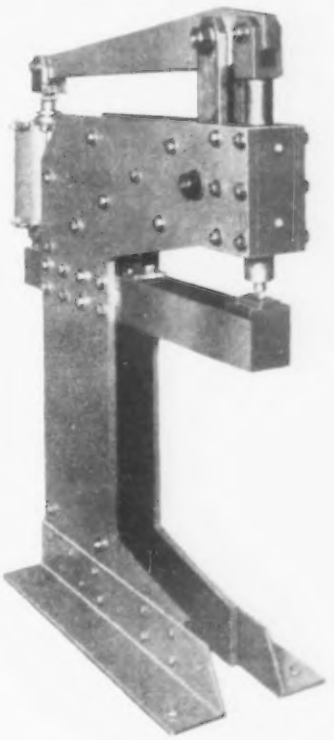
The machines are fixtured to permit quick and accurate turning over of the template and job, necessary in relieving dies from the back. The column of the machine slides on a horizontal bed and carries the vertical slide for the up-and-down of the cutter head. In addition to automatic control, the vertical and horizontal motions can be operated by means of switches or hand wheels. The transverse movement is in the work table, operated by hand wheel. In the type GG-1210 machine there is a power transverse feed for jig boring, also built-in vernier scales, magnifying glasses and reading lights. A power limiting relay on the control cabinet can be set by hand to limit the power of the cutting mill. If the cutter is taking too heavy a cut, the cutting ceases until the cutter clears; it then goes into the cut again.

A 1½-hp. direct-current motor drives the standard cutter spindle through V-belt and four-step pulleys. Four speeds are obtainable through open belt and four through back gears, engaged or disengaged by means of one lever. Means are provided for convenient adjusting of belt tension. A motor-driven pump supplies an ample stream of coolant.

Specifications include: Horizontal travel, 12 in.; vertical travel, 10 in.; transverse adjustment, 8 in.; table working surface, 18 x 18 in.; distance between spindle and tracer centers, 13 to 16 in.; distance from table top to spindle center, 0 to 10 in.; length, overall, 86 in.; depth, overall, 56 in.; and maximum height, 72½ in. The weight of the machine is approximately 5000 lb.

Piercing Press of Standard Plates and Shapes

FOR punching 1 5-16-in. diameter holes in 3-16-in. copper boiler shells, the Hannifin Mfg. Co., 621 South Kolmar Avenue, Chicago, has built the piercing press here shown, a feature of which is that except for the air cylinder it is constructed entirely of standard steel plates and shapes.



Specifications include: Power, 24,000 lb. (actual); ram stroke, 1⅜ in.; reach, 25 in.; and cylinder bore and stroke, 8 x 8 in.

THE 13 holes are tapped simultaneously around the periphery of the drop forged steel part. The work is locked in the fixture by a single-point overhead clamp, which is actuated by the crank-handle. Production is approximately 240 pieces an hour.

Thirteen Holes of Different Sizes and Depths Tapped Simultaneously

A SPECIAL machine for tapping 13 holes of several different sizes and depths in the periphery of a drop-forged steel part, with a production of approximately 240 pieces an hour, is here illustrated. In addition to the different sizes and various depths, uneven spacing of holes was a difficulty encountered. The machine was designed and built by the Ex-Cell-O Aircraft & Tool Corpn., 1200 Oakman Boulevard, Detroit.

The work is located in the fixture at the top of the machine by a three-point bearing and is locked in place by a single-point clamp. The handle controlling the locking mechanism, located at the top of the fixture, when rotating through an arc of 180 deg., locks the part in place. After the tapping operation the handle is moved back and the part is lifted clear of the taps, which insures ease in unloading the finished part.

The taps range from 3/16 to 9/16 in. in diameter, and are fed by individual lead-screws ground on the ends of the spindle. Each lead-screw is driven by a spline from a master gear through a stationary bronze nut. Each spindle must be adjusted to the correct depth; by releasing spring-hook clamps and turning the lead nut quick adjustment is obtained.

The machine proper is driven by a 7½-hp. reversing motor, controlled by an adjustable time limit switch, which determines the maximum travel of the taps. Coolant is piped to each tap from a manifold, a heavy stream washing all chips from each tap and at the same time removing all chips from the locating points in the fixture. All moving parts are sealed from dirt and chips.

Milling Cutter Designed to Use Tungsten Carbide

A FACE milling cutter having strength and rigidity to permit full use of the high cutting speeds and feeds of cemented-tungsten carbide has been placed on the market by the Kearney & Trecker Corpn., Milwaukee. The cutter is known as the full-back blade type because each blade is provided with a solid, positive contact along its entire back face, a feature regarded as highly essential for the correct application of tungsten carbide. Two of these cutters, the 5 and 8-in. size, respectively, are illustrated.

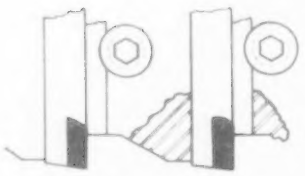
Instead of having the blades project beyond the face of the cutter body, which is the usual practice for other cutting metals, they are set practically flush with this face, whereas chip clearance is attained by cutting suitable slots in the body for each individual blade. This construction, shown at the top in the sectional views, provides positive full-length backing for the blades and assures maximum support directly back of the cutting edges where it is most essential.

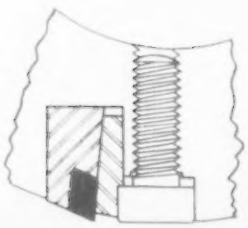
The cutter can be furnished in sizes ranging from 5 to 14-in. in diameter, either left or right hand, with blades that are applicable for medium and semi-roughing, or finishing cuts. Their design is suited for the milling of cast iron, semi-steel, malleable iron, bronze, copper and aluminum.

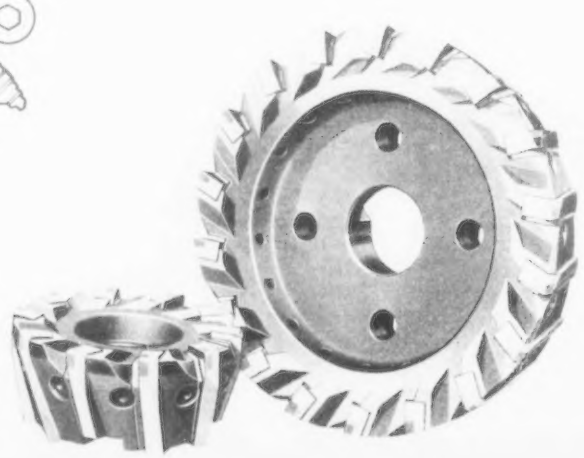
The cutter body is made from an extra-heavy steel forging that is heat-treated, hardened and ground. Each blade is made with a tapered face and held in place by a wedge having a corresponding taper, forming a positive lock that prevents loosening in the body. This construction is shown in the lower of the two sectional views. Hardened screws are used to hold the wedges in place.

Use of hardened steel pins in the cutter body, which in turn fit into cross slots machined in the blades, is emphasized as eliminating the possibility of end slippage. One pin is used for each blade, but by having a series of five holes in each body slot and four cross slots in each blade, adjustments can be made in increments of 1/16 in. This feature avoids the danger of having excessive overhang of the blades when readjustment of the entire set is made.

THE upper line sketch depicts method of supporting the tungsten-carbide blades; beneath it is shown the method of holding the blades in the body.







Index Appears Near Turning-Up Point

BY LEWIS H. HANEY

DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

FAVORABLE FACTORS

1. Machine tool orders increased in December.
2. Unfilled orders of United States Steel Corpn. increased.
3. Bond market is a little stronger in response to low money rates.
4. Decline in building permits was checked in November and December.
5. Basic commodity prices show a little greater stability.
6. Production in most industries is so far below normal requirements that progress is being made toward restoring a balance between supply and demand.
7. Stocks of copper, zinc and silk have been somewhat reduced.
8. A fairly liquid mercantile position; low brokers' loans; low "money rates."

UNFAVORABLE FACTORS

1. Continued decline in commodity prices, including raw materials.
2. The P-V line reacted a little in December and is below normal.
3. Foreign trade continues depressed, with reduced exports.
4. Sharp decline in employment and pay-rolls.
5. Continued decline in farm prices and purchasing power.
6. Building contracts (floor space) reached a new low in December.
7. Retail trade declined in December.
8. Large stocks of many commodities still exist.
9. Much frozen credit, excessive collateral loans, numerous bank failures.

COMMODITY price levels declined sharply in December. The physical volume of trade declined also, but not so much as prices. Therefore, the ratio between the two as measured in the P-V line was slightly lower. This fact suggests that physical volume has not yet been sufficiently contracted to allow a free movement of goods at current prices.

That is why prices continue to sag. In many cases the commodity markets are seeking the level at which demand and supply will be in equilibrium—at which prices will clear the market. When the commodity price level becomes stable again, we shall know that in the average market this equilibrium has been reached.

It is almost certain that on the average industrial production has been sufficiently curtailed. Clearly, production of most commodities is much below current requirements under normal conditions. But demand and supply conditions are not normal in two or three respects:

First, there are large accumulations of goods carried over from past production. This is true not only of wheat, cotton and wool, but also of copper, lead, zinc and tin. More than that, it is true of such commodities as leather, lumber, resin and turpentine, and silk hosiery.

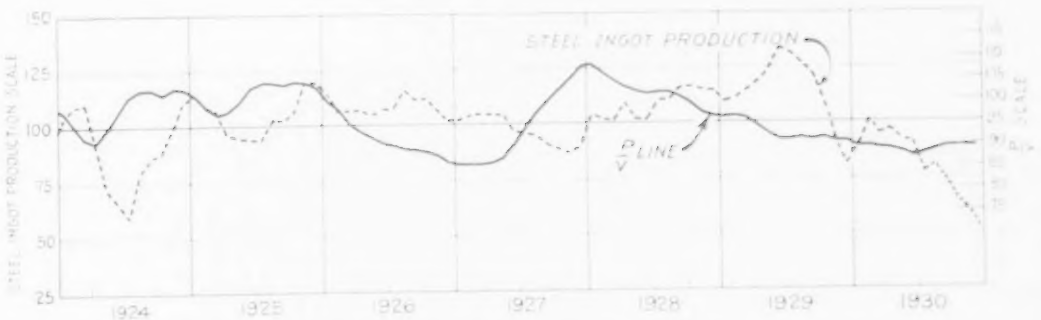
Second, the purchasing power of the average consumer has been greatly reduced and has shown no improvement. Not only are farm prices the lowest in 15 years, and agricultural purchasing power greatly impaired, but also the payrolls of factory labor have steadily declined until in December they were approximately 25 per cent lower than a year ago. Then there are the widespread losses due to forced liquidation of securities, real estate and commodities.

Third, there is the psychological factor of desire. Many consumers have awakened to a realization that for the present they have enough of the semi-luxuries they were buying so freely a year or so ago. There are not so many of the high-rolling Joneses to keep up with as before the stock market crash. Doubtless, too, a "depression psychology" is widespread, leading to economizing even where it is not necessary.

It may be said, however, that it would not take much of a rise in commodity prices to cause a rise in the P-V line, nor would it take much of a rise in the P-V line to bring it up to its normal level. Whenever that happens we may be fairly sure that general business recovery will set in.

As to the steel industry, the ingot output, having risen so long in 1928-1929 while the P-V line was declining, has now been falling long after the P-V line became stabilized. The trend of the barometer, however, now suggests that we may expect stabilization in steel production in the near future. But sustained increase in production seems likely to be postponed until the barometer, by rising to its normal level, indicates that conditions are right for a general improvement in business.

In short, it seems fairly clear that bottom levels and stabilization are in sight, while it remains uncertain when recovery and expansion may be expected.



Slight gains in the P-V line (here plotted on 3-month moving average) would bring it to normal and foretell imminent business recovery. Readjustment is proceeding slowly.

W. W. MACON
Editor

THE IRON AGE

A. I. FINDLEY
Editor-Emeritus

ESTABLISHED 1855

That Wage Question

THOSE with a penchant for statistics and a speaking acquaintanceship with Adam Smith are showing increasing concern about wages. Commodity prices, they say, have come down and only wages remain out of line. There must be deflation of wages before the road can be cleared for business recovery.

Such a viewpoint arises from a confusion of terms. It is true that wage *rates*, in many cases, have not been changed, but it should be clear to everyone that the *earnings* of labor have come down sharply. According to the January Federal Reserve *Bulletin*, factory employment declined 21 per cent in the 18 months following the peak of industrial activity in June, 1929, and total payrolls receded one-third, after allowance for seasonal variation. Although it is conceded that part of this sharp drop in the earnings of labor may have been due to reductions in wage rates, it is probable that it is attributable mainly to the decreased volume of employment and the spread of part-time operations. A reduction in both working time and wage rates would be a double blow to the earnings of labor, from which many companies have wisely protected their employees.

Undoubtedly maladjustments in wage rates exist in some fields, notably the building trades, but no one in recent years has charged the factory worker with inefficiency or "soldiering." He needs and deserves all the help that employers can now give him without endangering the integrity of their enterprises. James A. Farrell, president of the United States Steel Corpn., was speaking with an eye to realities when he declared that a general reduction of wage rates would greatly retard business recovery. Talking for an organization that takes seriously its responsibility to its employees, he is aware that it is difficult enough to prevent distress by dividing available work without further complicating the problem by wage rate reductions.

Less Flow of Capital Abroad

WHEN the United States was lending money abroad quite freely there was no little criticism of the performance. Since the flow has been of small proportions lately, a review of our foreign loan record is in order. As an indication of what occurred, total foreign capital issues, Governmental and corporate, publicly offered in the United States, nominal capital minus refunding, amounted to $44,015,288 in 1914, the initial year of the Department of Commerce summary first published last year. The next year they were $803,854,272, and in 1916, $1,155,901,264. Afterward they diminished, but in 1923 they were close to a billion and in each of the next four years they ran well over a billion, there being a sharp decrease in 1929.

An interesting comment regarding this flow of capital out of the country was that it indicated lack of opportunity at home for profitable investment. Of course, the promised returns were larger than would be expected in domestic investments, but certainly there were more or less commensurate risks. The comment was not taken very much to heart at the time, say three years ago, but in retrospect one can readily see there was a good bit in it. The common view now is that we expanded somewhat too freely as it was, along the lines pursued. There was too much doing of the old things better and not enough development of new things which would have a wide field.

Some economists abroad have been contending that our lending so little in the last couple of years is one of the important causes of world depression. Perhaps there is nothing easier as to human affairs than to confuse cause and result. In capital as in other things there is demand and supply. Our supply did not entirely dry up. There was certainly less demand, for economic conditions abroad were growing poorer and there was a less promising outlook. It may easily be that economic conditions abroad were as much a cause of the lessened outflow of our capital as the lessened flow was a cause of the economic conditions.

Bankers might put it more bluntly that recent prices of old foreign issues bought in the United States furnish no encouragement to us to take more of the same, and that would be perfectly logical. Presumably the best projects abroad were undertaken first, and remaining projects are less promising.

One of the fears of two or three years ago is now allayed, for then it was suggested that our continued lending abroad would eventually make trouble on account of its cumulative effect. Our foreign investments are very large as it is, of course, but a matter often overlooked is that we are very largely a debtor nation, for the last Department of Commerce finding, for the end of 1929, was approximately seven and a half billion dollars owed by us abroad. It is only on the net balance that we are a creditor nation. While the net balance is large the factors of more concern are the yields going out

the country and coming in, since there is much doubt on both sides as to yields, the demand there will be for commodities to move in the respective directions, the amount of money American tourists will henceforth spend, and various other items. The whole matter of international settlements is in a state of flux.

Still Not Enough Facing of Facts

HANKERING for the flesh-pots of Egypt must stop before public thought is on a sound basis as to this depression and the way out. Many men who have long held this view hoped that the new year would mark a turn, feeling that the old year had been long enough with its proposals of nostrums, with the futile application of a few. Such men are disappointed. There is perhaps not so much talk, but there is still considerable along lines that have been proved to lead us astray.

The public is still being told that there is an improvement in "sentiment," whereas the biggest mistake in 1930 was the altogether too good sentiment of the early months, for which the late months had to pay. If sentiment and action had been spread uniformly over 1930 the year would have had a better ending.

Too many conceive of depression as a disease which takes hold of one and which nature unaided by individual conduct will cure in the shortest possible time. Instead, it is an ailment which will be cured by a change to right living. We have the alternative of letting nature force us to the change or of anticipating nature's compulsion and hastening the recovery. Nature, in other words, is dealing in facts and we shall do well to deal in facts, for it is facts that are going to control in the long run.

Sentiment was not lacking among the heads of large enterprises in 1930. Railroads, utilities and private corporations carried out large programs of expenditure and still have much work in process of execution. Public expenditures were proportioned to previous tax-paying ability, although in the flush times there had been no little complaint that taxes were burdensome, and were not proportioned to prospective tax-paying ability.

Has "sentiment" been lacking among the rank and file of the people? There is still talk along that line about the people saving too much, when there is no proof that they are not spending all they have. A rise in savings banks deposits is no proof, for that might be due to capital being put into such accounts instead of being invested even in bonds. In any event the money would be used, for savings banks must lend or lose, since they pay interest. The difference would be only in the character of the spending. Those who complain of the people saving are those who would benefit more through spending by the people than through spending by those who borrow from savings banks. It depends on whose ox is gored.

The perfectly obvious fact is not being faced universally that 1929 was not a year of true prosperity, the kind that bears within itself the means of its perpetuation. There is no use trying to get back or hoping to get back to something that was wrong.

The fact is not being faced that the sum total of reasonable wants of the people was less than the quantity of goods that could be made and service that could be rendered by everyone working eight hours six or even five days a week, as hard as people are now willing to work and with the efficiency that the great progress of the last few years has brought about. When industry was improving slowly, hours were reduced from 14 to 12, from 12 to 10, from 12 to eight and then there was a stop while efficiency continued increasing. Nor is the fact faced that people will not and cannot afford to engage in constructing many houses when building trades wage rates and performance are what they are. Unpleasant facts must be faced as willingly as evidences of genuine improvement in business. Both should be faced calmly and without emotional extremes in sentiment.

Export Shrinkage in Second Half of 1930

SOMETHING of a measure of the inability of foreign buyers to purchase American products, owing to the world-wide economic disturbance, is afforded by the record of iron and steel shipments in 1930. In particular, the second half-year's outgoing tonnages may be compared with the first half and the story told with that difference in mind.

Tabulated herewith, the first-half and second-half tonnages are shown for total exports, finished and rolled steel, semi-finished steel, scrap and six specific items of finished products. The percentage of the total year's shipments made in the first half-year is given in each case.

	First Half	Second Half	Per Cent in First Half
Total exports	1,225,001	760,024	61.7
Finished material	780,084	561,707	58.1
Semi-finished	95,249	81,444	53.9
Scrap	278,445	72,054	79.4
Specific items:			
Tin plate	127,391	98,249	56.5
Structural	136,362	107,511	55.9
Pipe and fittings	133,588	36,997	78.3
Sheets, all types	129,708	113,118	53.4
Plates	61,636	36,703	62.7
Rails	54,633	40,668	57.3

Of all the items mentioned, sheets of various types and semi-finished steel were most nearly equal in the two half-years. In both cases the first-half shipments were between 53 and 54 per cent of exports for the year. At the other end of the scale, our shipments of scrap and of pipe and fittings in the first half were between 78 and 80 per cent of the year's total. In between, and varying between 55 and 63 per cent, are the other items quoted.

Particularly significant is the drop in scrap exports, of which the second-half tonnage was only slightly more than one-fourth that of the first half. This meant a slackening of steel-making operations in other countries to such an extent that they could carry on with comparatively little raw material from here.

Tin plate held up better than most items, the shipments of the two half-years having been respectively

56.5 and 43.5 per cent. The total for the year at 225,640 tons shows something of a drop from the four preceding years, but only about 10 per cent from their average. In those four years the annual export movement covered about 250,000 tons, year after year, with a maximum in 1929 of nearly 259,000 tons.

Volume Shrinkage Equably Distributed

POPULAR impressions are often contradicted by facts, when the latter are obtainable.

One common belief is that the large plant is advantaged, during depression periods, from the business getting standpoint. It seems reasonable to assume that the larger organization, with superior man and money power and elaborated consumer contact, can defend itself from volume shrinkage better than the smaller organization.

That this is not the case, so far as the steel industry is concerned, is indicated by the tonnage returns for 1930 as compared with 1929. In both years six companies (as at present integrated) reported more than 1,000,000 tons of rolled steel. Aggregate output of these six in 1930 was 20,709,000 gross tons. In 1929 the same six produced 28,239,000 gross tons. The reduction in 1930 was between 26 and 27 per cent.

Next in order of size come seven companies which in 1929 reported between 500,000 and 1,000,000 tons, and in 1930 reported smaller figures. The total for these seven dropped from 4,920,000 to 3,591,000 tons, or almost precisely 27 per cent.

Still smaller companies—those producing less than 500,000 tons in 1929—showed a slightly lower shrinkage of output (26 per cent) from the one year to the next. As a matter of fact, figures for 47 identical companies, comparing the two years, indicated a drop of 26.6 per cent. And the only companies which made larger tonnages in 1930 than in 1929 were all below 200,000 tons output in each year.

Evidently the smaller plant is not handicapped to the extent we have supposed it to be, when it can show such a record under most severe competitive conditions.

Depreciation—A Direct Cost

(Concluded from page 375)

prevent proper accounting based on present-day values for purposes of financial and profit and loss statements, and at the same time satisfy the requirements of the Internal Revenue Department.

It is important that proper values be shown upon financial statements for the guidance of management in determining company policy. Sound banking and credit demands that value and proper depreciation be shown on statements. That demand will be more insistent in the future. Expediency and sound business judgment will insist upon proper determination of these items. Any balance sheet or profit and loss statement that does not reflect fluctuations of value and the corresponding depreciation does not truly reflect the financial condition of any business.

Corporate laws in many States provide that dividends must be paid only out of earned surplus. Accountancy stands on record as sanctioning only such procedure. Surplus is not earned and subject to distribution if sufficient depreciation is not set aside to provide for actual replacement and continuance of plant property. One of the evils of insufficient facts concerning depreciation may be the misinterpretation of the actual position of the business.

Some plants have an advantage over their competitors due to acquirement of buildings and equipment at low cost during pre-war periods. In others a disadvantage exists due to acquisition made at the levels of the war and post-war peaks. The manager who is operating the plant acquired at low costs erroneously imagines his costs are lower merely because his books show lower figures. The operator of the plant built and equipped at the peak of prices is likewise working upon a basis that is incorrect. In both cases the executive dealing with the figures purporting to be costs overlooks the volume of the advantage or disadvantage his plant is operating under. Many times the same conditions exist in the same plant.

In Table II is shown an example which considers two like machines operating in the same plant, the dollar measurement of the advantage or disadvantage being shown in column "E."

At cost of acquisition the depreciation charge is much too low in comparison with the present-day values in the "pre-war case." In the "post-war case" the depreciation is too high. Both conditions cannot be correct, yet upon analysis of records of many companies, these conflicting conditions prevail.

Assuming selling prices be based on current markets, the figures of cost reflected by the pre-war case show an increased earning of $1,731.94, which is an advantage to the business. The post-war case indicates a disadvantage of $315.06, by way of excess depreciation charge to costs. The former results in overstated operating income and the latter case in understated income.

The first shows up an advantage that the management should have a measure for and that should set forth the true facts. In many cases where this condition exists the management is prone to make price cuts and adopt policies that deplete company funds that should be accruing for the purpose of replacements. The condensed profit and loss statement set forth in Table III will indicate how simple measurement of these conditions is.

By charging costs of production with depreciation based on present-day values ($6,769.88 as shown in the example) the manufacturing cost of sales will then reflect the present-day cost of producing the goods sold. The increase and decrease in the depreciation of $1,416.88 (net) will then appear on the statement as an income adjustment. The actual profit earned on the goods sold amounts to $5,000. However, the total income must be adjusted by $1,416.88, the amount of the difference in the depreciation, which then shows a net profit of $6,416.88. This profit is the same as would have appeared had not the adjustment of depreciation been made and the depreciation charged to costs had not been based on present-day values. The income adjustment is the measure of advantage or disadvantage of low or high-cost plant.

Steel Ingot Production Shows Further Slight Improvement

PRESENT Rate Estimated at 47 Per Cent — Automobile Output Increasing — Scrap Weakens at Pittsburgh and Chicago

THE iron and steel industry has shown a further slight gain in activity, although improvement has been spotty and has not been shared in by all products. Tin plate specifications continue to increase and some producers report moderately larger orders from the automobile industry for bars, sheets, strips and pig iron, but railroad equipment buying is at a standstill, rail releases are sluggish, structural steel requirements remain largely prospective and miscellaneous demand for iron and steel continues at close range, with no indications of a movement to replenish inventories.

The upturn in business since the first of the year has been disappointingly gradual; yet it is realized that a sudden rush of orders, unsupported by a commensurate expansion of consumer needs, would have raised false hopes.

STEEL ingot production for the country at large is now estimated at 47 per cent, compared with 46 per cent a week ago. Operating rates are unchanged in some centers and a decline is reported at Cleveland, but output in the aggregate has increased slightly.

Stability of the steel price structure is one of the most reassuring features of the market. While it is true that there is a lack of tonnage business to give prices a severe test, most large buyers having covered for the quarter at lower figures, consumers who buy in small lots are no longer seeking concessions with the placing of each order.

In the primary material markets the price situation is in the main quiescent, although not free from weakness. Resale pig iron, offered at 50c. a ton below furnace quotations, is a disturbing factor at Chicago. In Alabama, pig iron for district delivery has declined $1 to $13 a ton, Birmingham.

Heavy melting scrap is weaker at both Pittsburgh and Chicago and THE IRON AGE composite price for steel scrap has declined from $11.33 to $11.21 a gross ton, dipping under the low figure for 1930—$11.25—reached in December.

AUTOMOBILE manufacturers are planning their schedules cautiously, in close step with retail demand, but conservative forecasts place February output of the United States and Canada at 200,000 vehicles, or 25,000 units in excess of the expected production for January. Ford and Chevrolet alone are counted on to turn out 70,000 units each next month.

Motor car castings have been ordered in better volume for February delivery, and January shipments of pig iron to automotive foundries have been running 30 per cent higher than in December.

PROSPECTIVE construction work continues to pile up. New fabricated structural steel projects total 58,000 tons, compared with 46,000 tons a week ago. The greater part of this week's volume is accounted for by a single undertaking, the Chicago Post Office, requiring 45,000 tons. Structural awards, at 7500 tons, are the smallest in many months, comparing with 17,000 tons a week ago and 59,000 tons two weeks ago.

Line pipe makers are figuring on 30,000 tons of 8 to 14-in. pipe for a natural gas line from Wyoming to Kansas. The Standard Oil Co. of New York will soon inquire for 10,000 tons of pipe for a 100-mile gasoline line to be laid from East Providence, R. I., to Worcester and Springfield, Mass.

RAIL specifications show no increase at Chicago, where rail output remains unchanged at 50 per cent of capacity. Miscellaneous contracts booked during the week by Chicago mills call for 30,000 tons of rails and 9000 tons of accessories. The Nickel Plate's rail requirements for this year, orders for which are now being placed, total 27,000 tons, of which 40 per cent will be optional. The Canadian Pacific has purchased 35,000 tons of 130-lb. sections from the Algoma mill. The New York Central and the Erie have tentatively allocated orders for track accessories to supplement their recent rail contracts.

Demand for light rails has been adversely affected by more extensive use of conveyors, which are taking the place of track on many short run operations in coal mines.

MACHINE tool buying continues to show moderate improvement, giving rise to the expectation that total orders for January will show a gain over those of December, which in turn was a slightly better month than November.

Domestic fluorspar has declined $1 a ton to $15, mines, on contract business, but is still quoted at $16 for spot shipment.

THE IRON AGE composite prices for pig iron and finished steel are unchanged at $15.90 a gross ton and 2.142c. a lb. respectively.

PITTSBURGH

Steel Orders and Operations Have Made Little Further Gain

PITTSBURGH, Jan. 27.—The local steel industry has shown little change in the past week, either from the standpoint of production or current releases. In individual cases continued improvement is reported, while other large companies have been forced to admit a falling off in specifications, which seems more likely to be of a temporary nature than indicative of a trend.

Steel ingot production, with a few adjustments at individual plants, still averages about 45 per cent of capacity, and now seems to be fairly well correlated with the requirements of finishing mills. The increased needs of plate mills supplying barge yards and railroad car shops, as well as gradually expanding tin plate schedules, have been sufficient to offset lower output at a few sheet and strip mills. Production of track accessories is also expanding slightly, and rail schedules are holding their own.

Limited increases in the requirements of agricultural implement makers have brought temporary life to the cold-finished bar market, although the acceleration is not of sufficient amplitude to bring noticeable improvement to bar mill production in general. Demand for reinforcing bars has not expanded, although additional promise of spring activity continues to accumulate. Also the bar requirements of the automobile industry for February are still largely conjectural, in spite of generally expected improvement.

The steel price structure is regarded as highly favorable to expanded output. While it is true that the market is receiving little test on substantial tonnage orders, small lots of most of the principal products are being placed from day to day with little question as to price. Consumers who buy in this way seem to have recognized the apparent success of price stabilization and are no longer seeking lower quotations with the placing of each small order. The attitude of larger buyers, who are principally covered by contract for this quarter, is more difficult to ascertain, but a well established market on current business would undoubtedly prove a formidable background for writing of second quarter contracts.

Weakness in scrap prices is the feature of the market on raw materials, but a clarification of selling prices will not likely come before the letting of the Pennsylvania Railroad list on Feb. 4.

The list contains large tonnages of heavy melting steel and rails for the first time in three months. Pig iron continues very quiet, and the coke market is dull.

Orders for steel have maintained recent improvement, but have made no further gains.

* * *

Steel ingot rate for Pittsburgh district remains at about its average for the previous week, 45 per cent.

* * *

Rolling schedules in tin plate and rail accessories are expanding slightly.

* * *

Heavy melting scrap declines moderately in absence of important buying.

* * *

Finished steel price structure remains steady and firm.

Pig Iron

One or two sellers of pig iron report their business as having improved over that of December, but in other cases little change is noticed. Shipments have increased slightly in the last week or two, although foundry operations are very spotty and immediate deliveries are demanded in most cases. No inquiry of importance has appeared, and current sales are confined to small lots. No merchant stack changes are reported, although the Hubbard furnace of the Youngstown Sheet & Tube Co. is again operating, and a furnace of the Sharon Steel Hoop Co., at Lowellville, Ohio, is scheduled to go into blast about Feb. 1. Prices are nominally unchanged at the figures quoted below.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$17.00
Bessemer	17.50
Gray forge	16.50
No. 2 foundry	17.00
No. 3 foundry	16.50
Malleable	17.50
Low phos., copper free	$26.66 to 27.09

Freight rate to Pittsburgh or Cleveland district, $1.76.

Prices per gross ton, f.o.b. Pittsburgh district furnace:

Basic	$17.50
No. 2 foundry	17.50
No. 3 foundry	17.00
Malleable	18.00
Bessemer	18.00

Freight rates to points in Pittsburgh district range from 63c. to $1.13.

Semi-Finished Steel

This market is still quiet, with no new buying reported, and shipments averaging about the same as they have all month. Prices on billets, slabs and sheet bars are nominal at $30, Pittsburgh or Youngstown, and forging billets continue at $36, Pittsburgh. Wire rods are quiet, with prices unchanged at $35, and shipments running about 10 per cent heavier than in December.

Rails and Track Accessories

The Nickel Plate is about to close on its 1931 track requirements, about 27,000 tons of rails and accessories. The Central of New Jersey has placed a tonnage of spikes with an Eastern maker, but the track accessories recently inquired for by the New York Central, the Pennsylvania and the Erie have not yet been closed. Specifications for accessories have improved slightly since the first of the month, and mill operations are somewhat higher. Production at the local rail mill has also improved to some extent, but schedules will not approach capacity for several months.

Bars, Plates and Shapes

Specifications are holding up fairly well, but have not shown any material improvement in the last two weeks. Shipments of bars to the automobile industry are gaining slightly, and are expected to reach larger proportions in February. Makers of cold-finished bars and shafting are also increasing their requirements, but demand in this line is still rather spotty. Plate mills are engaged at about 50 per cent, with shipments to barge builders and the railroads predominating. General demand for plates is still rather dull. Structural steel activity is confined principally to prospective tonnage, with current lettings in the immediate district light. The smaller fabricators are running on a hand-to-mouth basis, and some of the larger interests have very low backlogs. Fabricated prices are also weak in spite of the fact that the mill quotation on shapes is stronger than at any time in recent months. Shipments of reinforcing bars are currently light, although much tonnage is in the offing and local distributers are busy figuring pending jobs. Prices are well maintained on current small orders for bars, although the market has not been tested on tonnage projects.

Cold-Finished Steel Bars

Specifications from the agricultural implement makers are improving, and automobile tonnage is holding its own. The past week was the best of the month, with at least two makers, but operations are not above 40 per cent

A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous, Advances Over Past Week in Heavy Type, Declines in Italics

	Jan. 27, 1931	Jan. 20, 1931	Dec. 29, 1930	Jan. 28, 1930
Pig Iron, Per Gross Ton:				
No. 2 fdy., Philadelphia	$17.76	$17.76	$17.76	$20.76
No. 2, Valley furnace	17.00	17.00	17.00	18.50
No. 2 Southern, Cin'ti	14.19	14.19	14.19	17.69
No. 2, Birmingham	13.00	14.00	14.00	14.50
No. 2 foundry, Chicago*	17.50	17.50	17.50	20.00
Basic, del'd eastern Pa.	17.25	17.25	17.75	19.59
Basic, Valley furnace	17.00	17.00	17.00	18.50
Valley Bessemer, del'd P'gh	19.26	19.26	19.26	20.76
Malleable, Chicago*	17.50	17.50	17.50	20.00
Malleable, Valley	17.50	17.50	17.50	19.00
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	80.00	80.00	80.00	100.00
Rails, Billets, Etc., Per Gross Ton:				
Rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Rerolling billets, Pittsburgh	30.00	30.00	30.00	34.00
Sheet bars, Pittsburgh	30.00	30.00	30.00	34.00
Slabs, Pittsburgh	30.00	30.00	30.00	34.00
Forging billets, Pittsburgh	36.00	36.00	36.00	39.00
Wire rods, Pittsburgh	35.00	35.00	35.00	40.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh., lb.	1.60	1.60	1.60	1.85
Finished Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.65	1.65	1.60	1.85
Bars, Chicago	1.75	1.70	1.70	1.95
Bars, Cleveland	1.70	1.70	1.65	1.85
Bars, New York	1.88	1.98	1.93	2.18
Tank plates, Pittsburgh	1.65	1.65	1.60	1.80
Tank plates, Chicago	1.75	1.70	1.70	1.95
Tank plates, New York	1.93	1.93	1.88	2.02½
Structural shapes, Pittsburgh	1.65	1.65	1.60	1.80
Structural shapes, Chicago	1.75	1.70	1.70	1.95
Structural shapes, New York	1.90½	1.90½	1.85½	2.04½
Cold-finished bars, Pittsburgh	2.10	2.10	2.00	2.10
Hot-rolled strips, Pittsburgh	1.55	1.55	1.55	1.80
Cold-rolled strips, Pittsburgh	2.25	2.25	2.25	2.65

* The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

	Jan. 27, 1931	Jan. 20, 1931	Dec. 29, 1930	Jan. 28, 1930
Finished Steel,				
Per Lb. to Large Buyers	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh	2.35	2.35	2.35	2.60
Sheets, black, No. 24, Chicago dist. mill	2.45	2.45	2.45	2.75
Sheets, galv., No. 24, P'gh	2.90	2.90	2.90	3.20
Sheets, galv., No. 24, Chicago dist. mill	3.00	3.00	3.00	3.40
Sheets, blue, No. 13, P'gh	2.05	2.05	2.05	2.25
Sheets, blue, No. 15, Chicago dist. mill	2.15	2.15	2.15	2.35
Wire nails, Pittsburgh	1.90	1.90	1.90	2.30
Wire nails, Chicago dist. mill	1.95	1.95	1.95	2.35
Plain wire, Pittsburgh	2.20	2.20	2.20	2.40
Plain wire, Chicago dist. mill	2.25	2.25	2.25	2.45
Barbed wire, galv., P'gh	2.55	2.55	2.55	2.95
Barbed wire, galv., Chicago dist. mill	2.60	2.60	2.60	3.00
Tin plate, 100 lb. box, P'gh	$5.00	$5.00	$5.00	$5.25
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh	$11.00	$13.25	$12.75	$16.50
Heavy melting steel, Phila	10.50	10.50	11.00	14.50
Heavy melting steel, Ch'go	10.12½	10.25	10.00	12.75
Carwheels, Chicago	10.75	10.75	11.75	14.00
Carwheels, Philadelphia	13.50	13.50	14.00	15.00
No. 1 cast, Pittsburgh	12.50	12.50	12.50	14.50
No. 1 cast, Philadelphia	12.00	12.00	12.00	15.00
No. 1 cast, Ch'go (net ton)	9.50	9.50	9.50	13.50
No. 1 RR. wrot., Phila	12.00	12.00	13.50	15.00
No. 1 RR. wrot., Ch'go (net)	8.50	8.50	8.50	12.00
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.50	$2.50	$2.50	$2.50
Foundry coke, prompt	3.50	3.50	3.50	3.50
Metals,				
Per Lb. to Large Buyers	Cents	Cents	Cents	Cents
Lake copper, New York	10.12½	10.12½	10.62½	18.12½
Electrolytic copper, refinery	9.75	9.75	10.25	17.75
Tin (Straits), New York	26.00	25.87½	26.87½	39.37½
Zinc, East St. Louis	4.00	4.00	4.12½	5.30
Zinc, New York	4.35	4.35	4.47½	5.65
Lead, St. Louis	4.55	4.55	4.95	6.10
Lead, New York	4.75	4.75	5.10	6.25
Antimony (Asiatic), N. Y.	7.25	7.37½	7.10	8.87½

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

and increased releases will have to continue for a longer period before any real improvement in output is established. Prices are holding at 2.10c., Pittsburgh.

Tubular Goods

The pipe market is very quiet, with no line pipe projects in prospect for immediate letting. The Columbia Gas & Electric Co. is not expected to order the remainder of the large pipe needed for its Eastern trunk line until April or May. Several other lines are in process of negotiation, but will not likely come up for bids for another two months. Buttweld pipe is very quiet, but little activity is expected during January and February, with seasonal improvement not due before spring. Shipments to the oil country this month are in about the same volume as was the case in December, and future prospects are uncertain. Mechanical tubing is slightly more active, and there is a fair demand for boiler tubes.

Wire Products

Improvement in shipments of wire products has been rather limited, and the month has hardly been up to expectations. Specifications from the jobbing trade are very light and are confined entirely to small lots. Manufacturers' wire is holding up better, but shipments to the automobile industry have not improved enough to have an immediate effect. Prices on nails are well maintained at $1.90 and $2 a keg, while bright hard wire is holding at 2.20c., Pittsburgh.

Sheets

The recent rate of incoming tonnage is being maintained, but few makers can report much improvement. Operations are spotty, with many mills still on a week-to-week schedule, and the industry's capacity is not engaged at an average of more than 40 per cent. Agricultural implement makers have accounted for the principal gains of the past week, and a few automobile makers have released tonnage for February shipment, which reflects a considerable increase over that for January. On the other hand, the two largest makers of cars in the low-priced field indicate no immediate increase in their needs. Demand from jobbers is very dull, and many who place rather large orders for first quarter are considerably behind in their specifications. Prices are well maintained at 2.35c., Pittsburgh, for black sheets, 2.90c. to 3c. for galvanized, 2.05c. for blue annealed, 1.90c. for light plates, and 3.30c. for auto body stock.

Tin Plate

Tin plate releases are still increasing and operations are well above 60 per cent of capacity. The leading interest is running at 55 to 60 per cent, while some of the independent makers report capacity schedules. The official price is unchanged at $5 a base box, Pittsburgh.

Strip Steel

The past week brought somewhat heavier releases to some makers, although aggregate specifications seem to have shown little change. In some cases automobile tonnage for February will show an improvement over that of the present month, but miscellaneous users of strips indicate no change in their requirements. Operations continue at about 40 per cent on hot-rolled material, while cold-

THE IRON AGE COMPOSITE PRICES

	Finished Steel	Pig Iron	Steel Scrap
Jan. 27, 1931	2.142c. a Lb.	$15.90 a Gross Ton	$11.21 a Gross Ton
One week ago	2.142c.	15.90	11.33
One month ago	2.121c.	15.90	11.25
One year ago	2.396c.	18.17	14.50
	Based on steel bars, beams, tank plates, wire, rails, black pipe and sheets. These products make 87 per cent of the United States output.	Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.	Based on heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	Finished Steel High	Finished Steel Low	Pig Iron High	Pig Iron Low	Steel Scrap High	Steel Scrap Low
1930	2.362c., Jan. 7;	2.121c., Dec. 9	$18.21, Jan. 7;	$15.90, Dec. 16	$15.00, Feb. 18;	$11.25, Dec. [illegible]
1929	2.412c., April 2;	2.362c., Oct. 29	18.71, May 14;	18.21, Dec. 17	17.58, Jan. 29;	14.08, Dec. [illegible]
1928	2.391c., Dec. 11;	2.314c., Jan. 3	18.59, Nov. 27;	17.04, July 24	16.50, Dec. 31;	13.08, July [illegible]
1927	2.453c., Jan. 4;	2.293c., Oct. 25	19.71, Jan. 4;	17.54, Nov. 1	15.25, Jan. 11;	13.08, Nov. [illegible]
1926	2.453c., Jan. 5;	2.403c., May 18	21.54, Jan. 5;	19.46, July 13	17.25, Jan. 5;	14.00, June [illegible]
1925	2.560c., Jan. 6;	2.396c., Aug. 18	22.50, Jan. 13;	18.96, July 7	20.83, Jan. 13;	15.08, May [illegible]

rolling units are engaged at a lower rate. Minimum prices of 2.25c., Pittsburgh, on cold-rolled strip and 1.55c. and 1.65c. on hot-rolled are being generally adhered to in this district.

Coal and Coke

Orders from the domestic trade showed a gain last week, and some sellers fell behind on their shipments. Additional tonnage is also coming from certain foundries, but this pick-up could hardly be called general. Furnace coke is very dull, although the scheduled blowing in of an independent blast furnace Feb. 1 will improve the market slightly. The price of furnace coke is well maintained at $2.50, Connellsville, while foundry quotations are holding.

Old Material

With one or two exceptions, the principal grades of scrap have weakened. Sales of No. 1 heavy melting steel have been negligible, and dealers are meeting with less difficulty in buying against old orders. Purchases of ordinary No. 1 grade can be made by local dealers at as low as $12.50, and the best grades are not bringing more than $13. Nevertheless, sellers would not offer scrap in substantial tonnages at less than $13.50, and the market is quoted at $12.50 to $13.50, a decline of 25c. a ton in the average price.

Interest this week is centered in the monthly list of the Pennsylvania Railroad, which contains 48,300 tons of scrap to be sold on Feb. 4. The list contains 10,400 tons of heavy melting steel and 12,750 tons of steel rails and is the first offering of these two grades in three months. The sale of this scrap will do a great deal to clarify the market, and will likely bring out considerable direct bidding by mills. The monthly list of the Baltimore & Ohio, containing about 11,000 tons, closes on Feb. 2, while the Norfolk & Western will sell 2500 tons on Feb. 6.

The market on hydraulic compressed sheets has been well maintained, and, in the opinion of some buyers as well as sellers, this grade might be quoted on the same basis as steel. With Detroit material selling at prices which would figure to about $11, Pittsburgh, the Pittsburgh market is limited to local production, and this grade has become very scarce. No important changes have occurred in the other grades of scrap, and the market in general will probably remain very quiet until the closing of the Pennsylvania list.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$12.50 to $13.50
No. 2 heavy melting steel	11.00 to 11.50
Scrap rails	12.50 to 13.00
Compressed sheet steel	12.50 to 13.00
Bundled sheets, sides and ends	10.50 to 11.00
Cast iron carwheels	14.00 to 14.50
Sheet bar crops, ordinary	14.00 to 14.50
Heavy breakable cast	10.50 to 11.00
No. 2 railroad wrought	12.50 to 13.50
Hvy. steel axle turnings	10.50 to 11.00
Machine shop turnings	6.00 to 6.50
Acid Open-Hearth Grades:	
Railr. knuckles and couplers	16.00 to 16.50
Railr. coil and leaf springs	16.00 to 16.50
Rolled steel wheels	16.00 to 16.50
Low phos. billet and bloom ends	18.00 to 18.50
Low phos. mill plates	16.00 to 16.50
Low phos. light grades	16.00 to 16.50
Low phos. sheet bar crops	16.50 to 17.00
Heavy steel axle turnings	10.50 to 11.00
Electric Furnace Grades:	
Low phos. punchings	15.00 to 15.50
Heavy steel axle turnings	10.50 to 11.00
Blast Furnace Grades:	
Short shoveling steel turnings	7.50 to 8.00
Short mixed borings and turnings	7.50 to 8.00
Cast iron borings	7.50 to 8.00
Rolling Mill Grades:	
Steel car axles	18.00 to 18.50
Cupola Grades:	
No. 1 cast	12.00 to 13.00
Rails 3 ft. and under	14.00 to 14.50

Warehouse Prices, f.o.b. Pittsburgh

	*Base per Lb.
Plates	2.85c.
Structural shapes	2.85c.
Soft steel bars and small shapes	2.75c.
Reinforcing steel bars	2.75c.
Cold finished and screw stock—	
Rounds and hexagons	3.35c.
Squares and flats	3.85c.
Bands	3.10c.
Hoops	4.10c.
Black sheets (No. 24), 25 or more bundles	3.25c.
Galv. sheets (No. 24), 25 or more bundles	3.85c.
Light plates, blue annealed (No. 10), 1 to 24 plates	2.75c.
Blue annealed sheets (No. 13)	2.65c.
Galv. corrug. sheets (No. 28), per square	4.25c.
Spikes, large	2.65c.
Small	2.90c. to 3.05c.
Boat	3.15c.
Track bolts, all sizes, per 100 count, 60 and 10 per cent	off list
Machine bolts, 100 count, 60 and 10 per cent	off list
Carriage bolts, 100 count, 60 and 10 per cent	off list
Nuts, all styles, 100 count, 60 and 10 per cent	off list
Large rivets, base per 100 lb	$3.30
Wire, black, soft ann'l'd, base per 100 lb	2.40
Wire, galv. soft, base per 100 lb	2.85
Common wire nails, per keg	2.15
Cement coated nails, per keg	2.15

*On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 3999 lb.

Detroit Scrap Unchanged

DETROIT, Jan. 27.—Little activity is expected in scrap until there is a further upturn in mill buying. Automobile scrap lists are the largest in several months and are likely to show another gain in February. The local steel plant is reported to be taking fair tonnages, but not in sufficient quantities to build up stocks. Prices are firm and unchanged.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	$9.50 to $10.00
Borings and short turnings	5.50 to 6.00
Long turnings	4.50 to 5.00
No. 1 machinery cast	10.00 to 10.50
Automotive cast	11.50 to 12.00
Hydraul. comp. sheets	9.50 to 10.00
Stove plate	7.25 to 7.75
New No. 1 busheling	8.00 to 8.50
Old No. 2 busheling	3.50 to 4.00
Sheet clippings	6.25 to 6.75
Flashings	7.75 to 8.25

Advocates Modification or Repeal of Sherman Law

Repeal or modification of the Sherman anti-trust law so as to stabilize the relationship between production and consumption and to stabilize employment was urged by Ethelbert Stewart, United States Commissioner of Labor Statistics, in an address before the College of the City of New York on Jan. 19. Speaking on the subject "Adjustment," Mr. Stewart vigorously pointed to the wisdom of permitting industry to do the necessary and reasonable thing so that it would be possible to regularize employment.

CHICAGO

Increase in Steel Production Halted, but Specifications Show Sizable Gain

CHICAGO, Jan. 27.—The upward march of steel production in this district has been somewhat arrested this week, but, with new specifications as an index, there seems reason to believe that the check is of momentary importance. Ingot output ranges from 40 to 45 per cent of capacity, but specifications received in recent days are the heaviest so far this year and, since most releases are for prompt shipment, this turn of affairs should react to the benefit of steel output before the end of the month.

Ordinarily, at this time of year, increased needs of rails can be counted on to boost steel production. Local mills have been rolling rails at 50 per cent of capacity for several weeks, but at the moment there is nothing in sight that would revise this schedule upward.

All thought of business revival in the Middle West must be tempered by three unfavorable factors: farm implement production is making slow headway; building work that is getting away to the slowest late winter start in years, and a railroad equipment market that is quiet almost to the point of non-existence. The bright spot in the building situation is public work. Preliminary estimates of the steel needed for the Chicago Post Office place the tonnage at 45,000, not including reinforcing bars. The railroad equipment market is almost devoid even of such intangible things as rumors, with the exception that the Southern Pacific may purchase some passenger equipment.

On the brighter side of the picture is growth in automobile manufacture and a firm belief by the trade that this will be a good year from the viewpoint of pipe line work. The first gasoline to have reached Kansas City by pipe line was to have been delivered Jan. 26.

While steel production has made no further gains in the week, specifications have increased, foreshadowing higher operations soon.

* * *

Ingot output ranges from 40 to 45 per cent of capacity.

* * *

Slowness of recovery in building and farm implement manufacturing and absence of railroad equipment buying are retarding factors.

* * *

Chicago Post Office will take 45,000 tons of structural steel and about 5000 tons of bars.

Pig Iron

This market has been disturbed by reports of sales of foundry pig iron at $17, base, a ton. Such sales are believed to be confined to resale iron, some of which has been in storage since last summer. Chicago furnaces are holding firmly to $17.50, furnace. Shipments of pig iron in January have shown moderate but consistent gains, and current specifications point to continued betterment. Stocks at furnaces are not what might be considered heavy, and the four merchant furnaces now in blast are being pressed to higher output. A few spot cars of charcoal iron have recently been sold at $24, furnace, and scattered purchases of Southern iron are reported at $10.50 a ton, Birmingham.

A user in southern Wisconsin has placed on order for 150 tons of 16 per cent silvery.

Prices per gross ton at Chicago

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$17.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75	18.00
Malleable, not over 2.25 sil.	17.50
High phosphorus	17.50
Lake Super. charcoal, sil. 1.50	27.04
S'th'n No. 2 fdy.	17.51
Low phos., sil. 1 to 2 cop. per free	$28.50 to 29.20
Silvery, sil. 8 per cent	26.79
Bess. ferrosilicon, 14-15 per cent	25.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c per gross ton.

Ferroalloys

Increased use of ferroalloys, so far as gray iron foundries are concerned, appears to be limited almost wholly to those units supplying castings to automobile manufacturers.

Fluorspar

Current prices for domestic gravel, f.o.b. Illinois and Kentucky mines, is $15 in tonnage lots and $16 a ton in carloads.

Plates

Several miscellaneous orders for tank plates total 1500 tons, all for immediate shipment. The outlook for business of this kind remains favorable, although inquiries are sluggish and, as a general rule, prompt action does not follow requests for prices. Demand for plates for use in the manufacture of line pipe is limited so far this year, at least when comparison is made with the closing months of 1930. However, the trade feels that the current year will show up well in this class of business. In fact, some even venture the opinion that 1931 will set a record in heavy pipe tonnage. While pipe and tank tonnages are offering moderate support to the plate market, there are two major groups of consumers that are hanging by the wayside. These are building contractors and the railroads. The use of plates for structural purposes, reduced under ordinary circumstances because of the growth in the use of special sections, remains very low, and the prospects for the spring months are not clearly defined.

The railroad car market is virtually at a standstill and the future is clouded. There is not a single whisper in this district of large car work that is to come. The Chicago & Illinois Midland, which late last year requested prices on 800 cars, is now making a move to purchase 100, action to be taken some time in February.

Notwithstanding the sluggishness of the plate market, quotations are firm at 1.75c, a lb., Chicago. This is the going price on new commitments. The bulk of shipments, however, are at the old quotation of 1.70c.

Cast Iron Pipe

It is reported that James B. Clow & Sons will be awarded 2100 tons of 30-in. pipe by Columbus, Ohio. The Sanitary District trustees, Chicago, are considering 18 bids on a general contract that calls for about 1800 tons of pipe and fittings. St. Cloud, Minn., is readvertising for bids on 500 tons of 12- and 16-in. pipe. Several private purchases, including pipe for public utilities, have been made recently.

Prices per net ton, deliv'd Chicago. Water pipe, 6-in. and over, $43 to $46; 4-in., $46 to $49; Class A and gas pipe, $3 extra.

Rails and Track Supplies

Total rail orders placed recently are for 30,000 tons. This business has come from a number of sources in the Middle West, such as the Kansas City Terminal and the Illinois Terminal Railways. Specifications against commitments are not growing and, as a result, output by Western mills has not expanded above 50 per cent of capacity. Miscellaneous orders for track supplies aggregate 2000 tons, and the growth in specifications for these commodities has necessitated heavier production. In addition, 35,000 tons of 130-lb. rails has been placed with the Algoma mill in Canada by the Canadian Pacific.

The light rail market is dull, partly as a result of the more extensive use of conveyors, which are taking the

place of track on many short run operations in coal mines.

Prices f.o.b. mill, per gross ton: Standard section open-hearth and Bess. rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 1.95c. angle bars, 2.75c.

Reinforcing Bars

This market remains seasonally dull, though small inquiries and awards of 100 tons and less each are more numerous. Bar tonnages specified in recent Illinois roadwork contracts have not been purchased. Reinforcing bar needs for paving purposes hold much promise. Bids will be opened Feb. 4, at Springfield, Ill., on 105 miles of paving and 12 bridges, requiring in all about 1500 tons of bars. It is said that this represents only part of a well-advanced program. Preliminary plans for the Chicago Post Office have been approved, and final plans are in preparation. This building will contain 2,400,000 sq. ft. of floor space and, if reinforcement is used in floor construction, fully 2500 tons of reinforcing bars will be needed.

Wire Products

Gains reported recently in this market are being held, but further progress is slow. Much of that section of the country which suffered drought last summer has experienced a very dry and unseasonably warm winter, and this is reacting against the outlook for spring crops. This situation is having the effect of retarding the jobbing trade, while on the manufacturers' side of the picture there is still a strong disposition to refrain from taking more tonnage than can be used in current production schedules. There is a general impression here that most automobile manufacturers are holding back until the true drift of the Chicago show can be measured. Attendance at the opening days is said to have been reassuring. Paving programs now promise a good spring movement of reinforcing mesh.

Bars

Demand for bars is broadening in a satisfactory way, as shown by the diversification of specifications and types of buyers. Shipping instructions have recently made the largest gains so far this year and inquiries point to further growth in use. Mild steel bars are steady at 1.75c. a lb., Chicago. Production of alloy steel bars has gained at least 10 points in the last week. Output is now at or even a shade above 50 per cent of capacity. Iron bars are in light demand. A slight increase in demand for rail steel bars has come from the bed industry, but other large users, among them barn equipment manufacturers, are far below the production schedules usually maintained at this time of year. Prices for rail steel bars are steady in the range from 1.60c. to 1.65c. a lb., Chicago district mill.

Structural Material

The past 10 days have been among the slowest in awards that local fabricators have experienced in many months. However, there are many plans on paper and in some respects there seems to be better things in store for local shops.

Prices for structural shapes are steady at 1.75c. a lb., Chicago, though much of the tonnage now being shipped was taken at the former quotation of 1.70c.

Bolts, Nuts and Rivets

Improvement in specifications from farm implement manufacturers is less marked this week than last, but use of these commodities by automobile manufacturers is giving a fairly good account of itself. Distribution by jobbers, as reflected by specifications, is undergoing a slow but steady growth.

Sheets

This market continues in a plodding way, having neither gained nor lost ground in recent weeks. The entire setup is that of limited purchases and specifications which barely meet immediate consumption. There seems to be little or no disposition to augment stocks, which in some measure may be taken as an indication that consumers cannot picture their needs except at very close range. In this respect, jobbers are not different from general manufacturers, except that distribution from warehouses is showing small improvement from week to week.

There is still the hope that spring will bring a revival in building that will call for a substantial tonnage of sheets. Should this come, it would seem that available supplies of such commodities as gutters and down spouts would be inadequate, because these necessities are now being manufactured in very limited quantities.

Prices remain steady on a moderate volume of sales. Output remains in the range of 35 to 40 per cent of capacity.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.50c. to 2.60c.; No. 24 galv., 3.05c. to 3.15c.; No. 10 blue ann'l'd, 2.05c. to 2.15c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.00c.
Soft steel bars	2.90c.
Reinforcing bars, billet steel	2.00c.
Rail steel reinforcement	1.50c. to 1.75c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.35c.
Flats and squares	3.85c.
Bands ¾ in. (in Nos. 10 and 12 gages)	3.10c.
Hoops (No. 14 gage and lighter)	3.65c.
Black sheets (No. 24)	3.80c.
Galv. sheets (No. 24)	4.35c.
Blue ann'l'd sheets (No. 10)	3.35c.
Spikes (⅜ in. and larger)	3.45c.
Track bolts	4.30c.
Rivets, structural	4.00c.
Rivets, boiler	4.00c.
	Per Cent Off List
Machine bolts	60 and 10
Carriage bolts	60 and 10
Coach or lag screws	60 and 10
Hot-pressed nuts, sq., tap. or blank,	60 and 10
Hot-pressed nuts, hex., tap. or blank,	60 and 10
No. 8 black ann'l'd wire, per 100 lb.	$3.45
Com. wire nails, base per keg	2.30
Cement c't'd nails, base per keg	2.30

Coke

Movement of coke is slow. Although foundry output is gaining, it is not up to seasonal expectations, and the use of coke for heating purposes of all kinds is comparatively low.

Old Material

A round tonnage of heavy melting steel has been taken by a local steel mill at $10.25 a gross ton, delivered. This is 25c. a ton below the last sale for a like grade. There are many factors that contribute to the weakness of the Chicago scrap market. In the first place, most dealers had hopefully looked to the first of the new year to bring a heavier consuming demand. They accumulated stocks which have not started to move, but which they are now being forced to liquidate at least in part. Also there is the question of weather, which is breaking records of 20 or more years in dryness and warmth, both of which are contributing factors in the gathering, preparation and movement of scrap. Then there are also the large stocks acquired in 1930 by steel mills and other heavy users.

Prices deliv'd Chicago district consumers:

	Per Gross Ton
Basic Open-Hearth Grades:	
Heavy melting steel	$10.00 to $10.25
Shoveling steel	10.00 to 10.25
Frogs, switches and guards, cut apart, and misc. rails	10.75 to 11.25
Factory hyd. comp. sheets	8.50 to 9.00
Drop forge flashings	7.75 to 8.25
No. 1 busheling	7.50 to 8.00
Forg'd cast and r'l'd steel carwheels	13.50 to 14.00
Railroad tires, charg. box size	13.50 to 14.00
Railroad leaf springs cut apart	13.50 to 14.00
Acid Open-Hearth Grades:	
Steel couplers and knuckles	12.00 to 12.50
Coil springs	13.50 to 14.00
Electric Furnace Grades:	
Axle turnings	11.00 to 11.50
Low phos. punchings	11.50 to 12.00
Low phos. plates, 12 in. and under	11.50 to 12.00
Blast Furnace Grades:	
Axle turnings	9.00 to 9.50
Cast iron borings	4.75 to 5.00
Short shoveling turnings	5.00 to 5.50
Machine shop turnings	4.25 to 4.75
Rolling Mill Grades:	
Iron rails	11.00 to 11.50
Rerolling rails	12.50 to 13.00
Cupola Grades:	
Steel rails, less than 3 ft.	12.50 to 13.00
Steel rails, less than 2 ft.	13.00 to 13.50
Angle bars, steel	11.50 to 12.00
Cast iron carwheels	10.75 to 11.25
Malleable Grades:	
Railroad	12.75 to 13.25
Agricultural	11.25 to 11.50
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heavier	26.00 to 31.00
	Per Net Ton
Rolling Mill Grades:	
Iron angle and splice bars	10.50 to 11.00
Iron arch bars, and transoms	11.00 to 11.50
Iron car axles	19.00 to 20.00
Steel car axles	13.00 to 13.50
No. 1 railroad wrought	8.50 to 9.00
No. 2 railroad wrought	8.75 to 9.25
No. 1 busheling	6.50 to 7.00
No. 2 busheling	4.50 to 5.00
Locomotive tires, smooth	12.50 to 13.00
Pipes and flues	5.50 to 6.00
Cupola Grades:	
No. 1 machinery cast	9.50 to 10.00
No. 1 railroad cast	9.00 to 9.50
No. 1 agricultural cast	8.50 to 9.00
Stove plate	7.75 to 8.25
Grate bars	7.50 to 8.00
Brake shoes	7.75 to 8.25

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards

CLEVELAND

Demand for Some Steel Products Continues to Show Slow Gain

CLEVELAND, Jan. 27. — Demand for finished steel continues to show a gain for most products, although some of the mills report no improvement. There is not much activity in plates, sheets and strip. However, some of the sheet mills have a backlog in orders recently placed by the automotive industry, and operations of Ohio sheet mills as a whole are better than last week. Some mills that were benefited by the release of automobile orders a few weeks ago do not have much tonnage left on their books.

Orders for the heavy-rolled products are largely against contracts, although some small lots are being placed at the present prices. Forge shops report quite an improvement in inquiries for automobile forgings, and there is a little better demand from this source for bars. Many of the orders from other sources are to replace depleted stocks. Quite a gain is reported in orders for wire products. Pig iron shipments continue to gain slowly.

While there is no expectation of a rapid upturn in business, many believe that the gain in orders indicates a start in a slow process of recovery. Local steel plant operations declined five points this week, one producer putting on an open-hearth furnace and another taking off two. Cleveland plants are operating at 50 per cent of ingot capacity. A Valley steel maker started a blast furnace at Warren this week.

There is little of interest in the price situation further than that prices are being well maintained all along the line and little effort is being made by consumers to secure concessions. This is particularly encouraging to the sheet industry. However, there has been little test of present prices on heavy-rolled steel products, as practically all consumers are under contract.

Pig Iron

There is a spotty improvement in foundry operations, and pig iron shipments continue to show a good gain over December. Foundries in the automotive field are operating better than in either November or December, and malleable foundries that make castings for the Ford Motor Co. have increased operations. While sales show no increase, inquiry is slightly more plentiful. Buying is largely in small lots for early needs. Cleveland interests sold 7000 tons during the week.

Prices are subject to competitive conditions depending upon the delivery points, but most Lake furnaces are holding to a minimum of $16 for foundry and malleable grades. For Cleveland delivery and for Michigan, $17.50 is maintained. One Southern producer has advanced its price 50c. a ton to $11, Birmingham, for No. 2 foundry.

The Otis Steel Co., which has been making basic iron for some time, has turned its furnace over to the foundry grade.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	$17.50
S'th'n fdy., sil. 1.75 to 2.25	$16.51 to 17.01
Malleable	17.50
Ohio silvery, 8 per cent	25.00
Stand. low phos., Valley	27.00

Prices are f.o.b. furnace except on Southern foundry and silvery iron. Freight rates: 50c. average local switching charge; $3 from Jackson, Ohio; $6.01 from Birmingham.

Sheets

While some of the mills are able to maintain recent increases in operations due to releases from the automotive industry, new business is rather light. Most consumers are buying in small lots for early requirements and usually want quick deliveries. The market is steady at regular prices. Auto body second sheets are in fair demand, and these are firm at the recent advance to $45 a ton for Nos. 18 and 20 gages.

Strip Steel

The demand for hot-rolled strip is slow, the recent improvement not being maintained. Consumers are buying from hand to mouth. Prices are firm at regular quotations. Cold-rolled strip is unchanged at 2.25c. to 2.35c., Cleveland. While some mills are holding to the higher price for any order less than car lots, there is a lack of uniformity among producers as to the size of an order that is entitled to the lower price.

Fluorspar

Domestic fluorspar, which recently has not had a clearly defined price, has settled to $15 a ton for contracts. For spot business, $16 is still being quoted. While some inquiry has come out, very few steel plants have closed contracts for the current year.

Bars, Plates and Shapes

Demand for bars shows a slight improvement from scattered sources. There is not much activity in plates and structural shapes. Building projects are somewhat more numerous than recently. The largest jobs pending are an addition to the May Co. store, 1500 tons, and extensions to the Otis Steel Co. plant, 1600 tons.

A few small-lot orders are being taken at the new prices, 1.65c., Pittsburgh, for plates and shapes, and 1.70c., Cleveland, for steel bars.

Rails

The Nickel Plate Railroad has sent out an inquiry for rail requirements for the current year. This calls for 27,000 tons, of which 60 per cent will be definitely placed, the remaining 40 per cent to be optional. The inquiry includes all the required track accessories.

Wire Products

There is a moderate gain in orders for nails and fencing from jobbers and for wire from the manufacturing trade. Nails are firm at $1.90 a keg, Cleveland. Ruling prices, except for small lots, are 2.20c. a lb. for bright hard wire and 3.20c. for spring wire.

Coke

The present price of $7.75 a ton, Ohio ovens, and $6, Connellsville base, have been reaffirmed for by-product foundry coke for February shipment. Shipments have gained slightly. While domestic coke is moving fairly well, the supply is in excess of the demand. This is unchanged at $4, ovens, for egg size.

Old Material

A Cleveland consumer, which recently purchased several thousand tons of steel making and blast furnace scrap, has ordered shipments of all grades suspended for an indefinite period, and this has had a depressing effect on the local market. In addition, a Valley mill has curtailed shipments. This, however, has had little effect on prices, although machine shop turnings and No. 1 busheling, for which there has been some demand in the Valley district, have declined slightly. Dealers are paying $7.50 for borings and turnings. They also bought a limited tonnage of No. 1 busheling at $10, delivered Valley mill.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades:		
No. 1 heavy melting steel	$10.50 to	$10.75
No. 2 heavy melting steel	9.75 to	10.25
Compressed sheet steel	9.25 to	9.50
Light bundled sheet stampings	8.00 to	8.50
Drop forge flashings	9.75 to	10.00
Machine shop turnings	5.25 to	5.50
Short shoveling turnings	7.75 to	8.00
No. 1 railroad wrought	9.50 to	10.00
No. 2 railroad wrought	10.00 to	10.50
No. 1 busheling	8.50 to	9.00
Pipes and flues	6.50 to	7.00
Steel axle turnings	9.50 to	10.00
Acid Open-Hearth Grades:		
Low phos., billet bloom and slab crops	16.50 to	17.00
Blast Furnace Grades:		
Cast iron borings	7.25 to	7.50
Mixed borings and short turnings	7.25 to	7.50
No. 2 busheling	6.50 to	6.75
Cupola Grades:		
No. 1 cast	12.00 to	12.50
Railroad grate bars	10.00 to	10.50
Stove plate	10.50 to	11.00
Rails under 2 ft	16.00 to	16.50
Miscellaneous:		
Rails for rolling	16.25 to	16.50
Railroad malleable	12.50 to	13.00

NEW YORK

Pipe Projects Feature Steel Inquiry—Pig Iron Sales 4500 Tons

NEW YORK, Jan. 26.—The pig iron market is still apathetic, with shipments sluggish and sales light. Bookings in this district, at 4500 tons, compare with 6000 tons in each of the two preceding weeks. Only about 3000 tons of formal inquiry is in this market, although several large lots are still pending for New England delivery. Rice, Barton & Fales, Inc., Worcester, Mass., is asking for prices on about 1500 tons for first half shipment. A Torrington, Conn., melter is understood to have closed in part against an inquiry for 1000 tons for shipment throughout the year.

Prices on Alabama iron appear to be stiffening. One important producer has withdrawn a price of $10.50, Birmingham, and is now quoting $11. On some recent sizable inquiries as low as $10, Birmingham, was quoted. Buffalo iron still ranges from $15.50 to $16, furnace, but in this vicinity is not competitive from a delivered price standpoint with irons from other producing centers. New England iron is offered for truck delivery at nearby New Jersey points at $17.25 a ton, and delivered prices on eastern Pennsylvania iron are not much higher.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., all 1.75 to 2.25	$20.41 to $20.91
*Buff. No. 2, del'd east. N. J.	18.28 to 19.28
East. Pa. No. 2 fdy., all 1.75 to 2.25	17.39 to 18.39
East. Pa. No. 2X fdy., all 2.25 to 2.75	17.89 to 18.89

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

*Prices delivered to New Jersey cities having rate of $5.28 a ton from Buffalo.

Finished Steel

A slight gain in steel orders during the past week is reported by most of the local steel sales offices. The chief significance of current orders is that in many instances they come from manufacturers who have not been in the market for steel for many weeks. A characteristic of the demand, however, is that orders and contract specifications are small, and there seems to be no movement toward the building up of inventories. Rather, most steel consumers are taking only such material as they have actual and immediate use for.

There are, however, some developments affecting sizable tonnages. The pipe market is more active in large projects than any other branch of steel business. One of the outstanding inquiries is for 30,000 tons of 8 to 14-in. thin-wall pipe for a natural gas line in Kansas and Wyoming. Other pipe line projects are in the making. One on which prices soon will be asked is a gasoline pipe line from East Providence, R. I., to Worcester and Springfield, Mass., to be built by the Standard Oil Co. of New York, about 100 miles, requiring close to 10,000 tons of pipe.

The New York Central and Erie railroads have tentatively allocated orders for track accessories, and formal orders will be placed soon. It is understood that the tonnages are about half those ordered a year ago.

Reinforcing Bars

Awards of substantial tonnages of bars continue, but there is very little new inquiry to replace the contracts being closed. About 500 tons in the New Jersey approach to the Hudson River bridge has been awarded by the Port of New York Authority. One of the three contractors on the New York Central Railroad section of the West Side Express Highway has placed 336 tons of bars and the other two contractors have 900 tons still to be awarded. Prices are unchanged on the basis of 1.70c. a lb., Pittsburgh, or 2.03c., delivered New York.

Cast Iron Pipe

Buying of pressure pipe by public utilities continues, but municipal buying is unusually light. Concessions from $35 to $36 a ton, f.o.b. Northern foundry, are still being granted to users who are willing to accept winter delivery. A large utility in New York has closed on a tonnage of special joint centrifugally-cast pipe for high-pressure gas service in the Southwest, having bought 2000 tons from a Birmingham maker for city street installation and an additional 2200 tons of steel pipe for suburban installation on the same project.

Prices per net ton deliv'd New York: Water pipe, 6-in. and larger, $37.90 to $38.90; 4-in. and 5-in., $40.90 to $41.90; 3-in., $47.90 to $48.90. Class A and gas pipe, $3 extra.

Warehouse Business

Since the recent reduction in prices, the market on black, galvanized and blue annealed sheets has been fairly firm, with concessions granted only on sizable purchases. While there has been a slight improvement in buying in the past week, jobbers report business still decidedly small.

Coke

Foundry coke specifications give no indication of an increase in foundry melt. Furnace coke prices range from $2.50 to $2.60 a net ton, Connellsville, and foundry coke quotations follow:

Special brands of beehive foundry coke, $4.70 to $4.85 a net ton, ovens, or $8.41 to $8.56, delivered to northern New Jersey, Jersey City and Newark, and $9.29 to $9.44 to New York and Brooklyn; by-product foundry coke, $9 to $9.40, Newark or Jersey City; $10.06, New York or Brooklyn.

Old Material

Brokers are offering $10.25 a ton, delivered, for No. 1 heavy melting steel at Claymont, Del., and $10.50 a ton, delivered, to a mill at Coatesville, Pa. Recently one eastern Pennsylvania user of heavy melting steel has been offering to buy a small tonnage at $10.50 a ton, delivered. Other grades of scrap are inactive and prices generally unchanged in the absence of transactions.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	$6.75 to	$7.00
Heavy melting steel (yard)	$5.00 to	5.50
No. 1 hvy. breakable cast	7.00 to	7.50
Stove plate (steel works)	4.75 to	5.00
Locomotive grate bars	4.75 to	5.00
Machine shop turnings		3.50
Short shoveling turnings		3.50
Cast borings (blast fur. or steel works)		3.50
Mixed borings and turnings		3.00
Steel car axles		14.00
Iron car axles	17.50 to	18.50
Iron and steel pipe (1 in. dia., not under 2 ft. long)		7.25
Forge fire		7.00
No. 1 railroad wrought		8.75
No. 1 yard wrought, long		7.75
Rails for rolling	9.25 to	9.75
Stove plate (foundry)	5.50 to	6.00
Malleable cast (railroad)	9.50 to	10.00
Cast borings (chemical)	8.50 to	9.00

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast		$12.50
No. 1 hvy. cast (columns, bldg. materials, etc.); cupola size		10.50
No. 2 cast (radiators, cast boilers, etc.)		10.00

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars, small shapes	3.10c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.40c.
Flats and squares	3.90c.
Cold-roll. strip, soft and quarter hard	4.95c.
Hoops	3.75c.
Bands	3.40c.
Blue annTd sheets (No. 10)	3.25c.
Black sheets (No. 24*)	3.50c.
Galvanized sheets (No. 24*)	4.00c.
Long terne sheets (No. 24)	5.00c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, ½ x ½ in. and larger	3.40c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.75c.
Open-hearth spring steel, bases,	4.50c. to 7.00c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

	Per Cent Off List
Machine bolts, cut thread:	
¾ x 6 in. and smaller	65 to 65 and 10
1 x 30 in. and smaller	65 to 65 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	65 to 65 and 10
¾ x 20 in. and smaller	65 to 65 and 10
Boiler Tubes:	Per 100 Ft.
Lap welded, 2-in.	$19.00
Seamless steel, 2-in.	20.25
Charcoal iron, 2-in.	26.25
Charcoal iron, 4-in.	67.00

PHILADELPHIA

Automobile Body Builders Buying Sheets—Steel Prices Steady

PHILADELPHIA, Jan. 27.—Although new steel business booked by eastern Pennsylvania mills has not materially increased, sentiment continues to improve as sellers gain confidence that prices will be firm through the quarter.

Activity is increasing among automobile body manufacturers in this district, following some releases on their contracts with Detroit producers. Local radio companies are maintaining fair operating rates. Local stove makers are still quiet, despite reports of increased operations by the stove industry in other districts, and structural fabricating shops are only moderately well engaged.

At a recent opening of bids by the Pennsylvania Railroad, $2.50 a 100 lb., f.o.b. mill, was quoted on spikes, and $46 a ton, mill, on the tie plates.

Pig Iron

Foundry iron buying is still limited to immediate requirements, but, with only a small percentage of consumers covered or the current quarter, a continuation of steady, small-lot buying is expected. Quotations of eastern Pennsylvania furnaces range from $17 to $17.50 a ton, furnace. Southern prices on foundry iron are slightly firmer than for some months, $11 a ton, Birmingham furnace, applying on small lots, with $10.50 a ton available on the larger and more desirable business. Following recent contracting for basic iron by consumers in this district, the market is quiet, most users having covered their requirements for the rest of the quarter.

The Lukens Steel Co., Coatesville, Pa., announces that it has contracted on a sliding scale basis for all of its 1931 pig iron requirements with the Alan Wood Steel Co., whose furnaces are at Swedeland, Pa. The Lukens company has for some time been getting its basic iron from the Bethlehem furnaces at Coatesville, which have been shut down.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	$17.76 to $18.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	18.26 to 19.26
East. Pa. No. 1X	18.76 to 19.76
Basic (del'd east. Pa.)	17.25 to 17.50
Malleable	19.00 to 20.00
Stand. low phos. (f.o.b. cast. Pa. furnace)	23.00 to 24.00
Cop. b'r'g low phos. (f.o.b. furnace)	22.00 to 23.00
Va. No. 2 plain, 1.75 to 2.25 sil.	22.29
Va. No. 2X, 2.25 to 2.75 sil.	22.79

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Steel Bars

Demand is limited to small lots, both in new business and in specifications against current contracts. Quotations are unchanged at 1.60c. to 1.65c. a lb., Pittsburgh. Reinforcing bars continue at 1.65c. to 1.75c., Pittsburgh, or 1.94c. to 2.04c., delivered Philadelphia. Rail steel bars are about 1.50c., Franklin, Pa., or 1.79c., Philadelphia.

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.50c.
Structural shapes	2.50c.
Soft steel bars, small shapes, iron bars (except bands)	2.60c.
Reinforc. steel bars, sq., twisted and deform.	2.50c. to 2.60c.
Cold-fin. steel, rounds and hex.	3.40c.
Cold-fin. steel, sq. and flats	3.90c.
Steel hoops	3.15c.
Steel bands, No. 12 to ⅛-in. inclu.	2.90c.
Spring steel	5.00c.
*Black sheets (No. 24)	3.60c.
†Galvanized sheets (No. 24)	4.15c.
Light plates, blue annealed (No. 10)	3.05c.
Blue ann'd sheets (No. 13)	3.20c.
Diam. pat. floor plates, ¼-in.	5.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 40 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

Shapes

Fabricators are in need of orders, but new projects in this district are rather limited, except for some small tonnages for bridge construction. Bids have been asked on structural steel for two office buildings in Washington, one for the American Red Cross and one for the Standard Oil Co. of New Jersey. Shape prices are unchanged at 1.70c. a lb., f.o.b. nearest mill to consumer, or 1.76c., delivered Philadelphia, with only occasional concessions to 1.65c., mill, or 1.71c., Philadelphia, on the larger tonnages.

Plates

While 1.70c., Coatesville, Pa., or 1.80½c., Philadelphia, is the minimum quotation of eastern Pennsylvania mills, it is also the maximum on most business, the only exceptions being small lots of miscellaneous specifications. Mills are still operating about 40 per cent of capacity in their rolling departments and in certain instances are continuing on a short week.

Sheets

Radio manufacturers are operating at fair rates and have been buying small and medium-sized tonnages of sheets. In the past week, automobile body makers have received contract releases and have placed small lots of sheets for prompt delivery. Prices are firm at 2.35c., Pittsburgh, or 2.64c., Philadelphia, for black, and 2.90c., Pittsburgh, or 3.19c., Philadelphia, for galvanized. Blue annealed sheets, No. 13 gage, are quoted at 2.05c., Pittsburgh, or 2.34c., Philadelphia, and blue annealed plates, No. 10 gage, are 1.90c., Pittsburgh, or 2.19c., Philadelphia, for the wider specifications, and usually 1.75c., base, Pittsburgh, or 2.04c., Philadelphia, for the narrower widths, where competition is encountered from the continuous mills.

Imports

In the week ended Jan. 24, 1501 tons of pig iron arrived at this port from British India, and 77 tons of iron ore was received from Spain. Iron and steel arrivals consisted of 60 tons of steel bars from Belgium and the following lots of material from Sweden: 24 tons of steel bars, 14 tons of iron bars, 11 tons of steel billets, 9 tons of bearing tubing, 6 tons of strip steel and 3 tons of iron sheets.

Old Material

A consumer at Claymont, Del., which usually buys only No. 1 heavy melting steel, has recently closed for a few hundred tons of No. 2 steel at $8.50 a ton, delivered, the specification calling for material free from automobile steel and alloys. This grade is understood to be for trial in producing steel for the company's new sheet mill, which is being started. Other grades of scrap are quiet and unchanged.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$10.00 to $11.00
No. 2 heavy melting steel	9.00 to 9.25
Heavy melting steel (yard)	8.50
No. 1 railroad wrought	12.00 to 12.50
Bundled sheets (for steel works)	9.00
Hydraulic compressed, new	9.00 to 10.00
Hydraulic compressed, old	8.00 to 8.50
Machine shop turnings (for steel works)	6.50 to 7.50
Heavy axle turnings (or equiv.)	9.50 to 10.00
Cast borings (for steel works and roll. mill)	7.50
Heavy breakable cast (for steel works)	11.00 to 11.50
Railroad grate bars	9.00
Stove plate (for steel works)	9.00
No. 1 low phos., hvy. 0.04% and under	17.00 to 18.00
Couplers and knuckles	15.50 to 16.00
Rolled steel wheels	15.50 to 16.00
No. 1 blast f'nace scrap	6.50 to 7.00
Wrot. iron and soft steel pipes and tubes (new specific.)	11.50 to 12.00
Shafting	18.00
Steel axles	18.00 to 18.50
No. 1 forge fire	11.00
Cast iron carwheels	13.50 to 14.00
No. 1 cast	12.00 to 12.50
Cast borings (for chem. plant)	14.00 to 14.50
Steel rails for rolling	12.50 to 13.00

Institute of Iron & Steel Scrap, Inc., 11 West Forty-second Street, New York, will hold its annual convention in Cleveland on March 10, 11 and 12.

BIRMINGHAM

Pig Iron Prices Decline $1 a Ton for District

BIRMINGHAM, Jan. 27.—The price situation on Birmingham pig iron for district delivery became unsettled last week, when concessions of as much as $1 a ton were offered. Some iron for first quarter delivery was sold at $13, base, but no movement of importance has yet resulted from the lower price. Some of the merchant producers have continued to maintain quotations at $14. Demand spread a little more last week, both small-lot orders and forward buying having been slightly better. Rush orders are still frequently reported.

No changes are reported in furnace operations, the total of active stacks being 10, of which eight are producing foundry iron, one basic iron and one recarburizing iron.

Prices per gross ton, f.o.b. Birmingham district furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	$13.00 to $14.00
No. 1 fdy., 2.25 to 2.75 sil.	14.00 to 14.50
Basic	13.00 to 14.00

Finished Steel

Mill interests report a mild tendency toward a further increase in business. Operations are the best in several months. The bar and cotton tie mills of the Connors Steel Co. are being placed in operation again this week, having been closed since December. The number of active open-hearths remains at 15, leaving eight on the idle list.

Structural steel fabricators report current demand easier. The Virginia Bridge & Iron Co. has booked 150 tons for an airport at Birmingham. Upward of 500 tons of reinforcing bars has been booked by Dudley Bar Co. for the Louisiana capitol at Baton Rouge.

Cast Iron Pipe

New business of pressure pipe producers remains active. Orders of the United States Pipe & Foundry Co. include 65,000 ft. of 24-in. pipe for Lawton, Okla.; 1500 tons for Oakland, Cal., and 200 tons for Aberdeen, Wash. The American Cast Iron Pipe Co. has booked 300 tons for Honolulu. Contract for about 250 tons at Bogalusa, La., went to the National Cast Iron Pipe Co. District plants have bids in on important tonnages at Columbus, Ohio, and Cleveland, and St. Paul, Minn. Bids have been opened on 600 tons for the Panama Canal. Detroit is to open bids Feb. 2 on about 2500 tons of pipe, and Roswell, N. M., opens bids Feb. 3 on 400 tons. The United States Pipe & Foundry Co. is starting production of 24-in. De Lavaud pipe at its North Birmingham shops. Quotations remain at $37 to $38 a ton, Birmingham, but concessions continue on large sizes and on orders for immediate shipment.

Coke

Specifications show gradual improvement. There has been some increase in buying for coke to be shipped out of the district. Active ovens total 881 of 1390, but there are prospects of increased production before end of January.

Old Material

A large steel interest has purchased upward of 1000 tons of heavy melting steel at a price reported to be below the published minimum of $10.50. Little life is shown in cast grades. In most cases quotations are little more than nominal.

Prices per gross ton deliv'd Birmingham dist. consumers' yards:

Heavy melting steel	$10.50 to $11.00
Scrap steel rails	10.50
Short shoveling turnings	9.00
Cast iron borings	9.00
Stove plate	9.00
Steel axles	19.00
Iron axles	18.00
No. 1 railroad wrought	10.00
Rails for rolling	11.50 to 12.00
No. 1 cast	11.00 to 11.25
Tramcar wheels	11.00 to 11.25
Cast iron borings, chem.	13.50
Cast iron carwheels	11.00

ST. LOUIS

Award of 2800 Tons of Reinforcing Bars Only Sizable Business

ST. LOUIS, Jan. 27.—While melters are showing some interest in pig iron, the volume of new business is very light. Stocks of iron in the hands of melters are small. Shipments of the St. Louis Gas & Coke Corpn. continue heavy, melters being agreeable to completing old contracts. Stove foundries here and in Belleville are showing more life, and most of them are now in operation, although not at full capacity. Prices continue firm.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$17.50
Malleable, f.o.b. Granite City	17.50
N'th'n No. 2 fdy., deliv'd St. Louis	19.66
Southern No. 2 fdy., deliv'd	14.92
Northern malleable, deliv'd	19.66
Northern basic, deliv'd	19.66

Freight rates: 75c. (average) Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Finished Steel

Twenty-eight hundred tons of reinforcing bars for the Merchandise Mart, which has been pending for several months, was awarded in equal amounts to the Laclede Steel Co. and the Kalman Steel Co. The steel awarded to the latter will be rolled by the Scullin Steel Co. This is the largest reinforcing bar award in months. No other large projects are pending. Structural steel fabricators for the most part have closed down because of lack of business, and there is nothing sizable now on which to bid, although many projects are being considered. Buying of plates, shapes, bars and sheets has been disappointing. The favorable reaction elsewhere since Jan. 1 has not yet been felt here. The tin plate department of the Granite City Steel Co. is a notable exception, that branch of the company's operations being at 75 per cent of capacity.

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shafting, screw stock	3.60c.
Black sheets (No. 24)	4.25c.
Galv. sheets (No. 24)	4.60c.
Blue ann'l'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	4.10c.
Galv. corrug. sheets	4.70c.
Structural rivets	4.15c.
Boiler rivets	4.15c.
	Per Cent Off List
Tank rivets, ¾-in. and smaller, 100 lb. or more	65
Less than 100 lb.	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50

Old Material

The scrap market was quiet during the last week, the expected buying movement not having materialized. Dealers say they now expect no buying of consequence until about Feb. 15. Several of the larger dealers here are showing confidence in the future of the market by buying all scrap iron offered and laying it down in their yards. Prices are unchanged.

Railroad lists: Union Pacific, 1900 tons; Milwaukee Road, 580 tons and 108 carloads; Louisville & Nashville, 130 tons; Chicago & Eastern Illinois, 15 carloads; St. Louis Southwestern, 14 carloads; Pullman Co. (St. Louis), 4 carloads.

Dealers' buying prices per gross ton, f.o.b. St. Louis district:

Selected heavy melting steel	$10.50 to $11.00
No. 1 heavy melting or shoveling steel	9.50 to 10.00
No. 2 heavy melting or shoveling steel	9.00 to 9.50
No. 1 locomotive tires	11.00 to 11.50
Misc. stand.-sec. rails including frogs, switches and guards, cut apart	10.50 to 11.00
Railroad springs	13.00 to 13.50
Bundled sheets	6.50 to 7.00
No. 2 railroad wrought	9.50 to 10.00
No. 1 busheling	7.00 to 7.50
Cast iron borings and shoveling turnings	6.50 to 7.00
Iron rails	9.50 to 10.00
Rails for rolling	11.75 to 12.25
Machine shop turnings	3.50 to 4.00
Heavy turnings	8.00 to 8.50
Steel car axles	14.00 to 14.50
Iron car axles	20.50 to 21.00
Wrot. iron bars and trans.	12.00 to 12.50
No. 1 railroad wrought	7.50 to 8.00
Steel rails, less than 3 ft.	13.00 to 13.50
Steel angle bars	10.00 to 10.50
Cast iron carwheels	11.00 to 11.50
No. 1 machinery cast	10.50 to 11.00
Railroad malleable	10.50 to 11.00
No. 1 railroad cast	9.75 to 10.25
Stove plate	8.00 to 8.50
Relay. rails, 60 lb. and under	16.00 to 16.50
Relay. rails, 70 lb. and over	20.00 to 21.00
Agricult. malleable	9.50 to 10.00

BUFFALO

Bethlehem Steel's Operations Show Further Slight Gain

BUFFALO, Jan. 27.—The pig iron market is quiet. Aside from inquiries from the General Electric Co. for a total of 2400 tons, part of which may already have been covered, there is little demand for sizable tonnages. Sales for the week were upward of 3000 tons, but most of these were in lots of not more than 100 tons each. Buffalo producers continue to quote $17.50, base, for district delivery, with $16 the usual minimum on orders taken in districts where Buffalo iron meets competition from other producing centers.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	$17.50
No. 2X fdy., sil. 2.25 to 2.75	18.00
No. 1 fdy., sil. 2.75 to 3.25	19.00
Malleable, sil. up to 2.25	18.00
Basic	17.50
Lake Superior charcoal	27.28

Finished Steel

Operations of steel mills in this district are slightly better. The Lackawanna plant of the Bethlehem Steel Co. is operating 13 open-hearths, with the possibility that two may be added some time this week. The Wickwire-Spencer plant and the Donner plant of the Republic Steel Corpn. are operating two each.

Cast Iron Pipe

The city of Buffalo has placed an order for 4000 tons of cast iron pipe with the United States Pipe & Foundry Co.

Old Material

The market for No. 2 heavy melting steel shows some indication of a possible scarcity developing soon, with three plants taking in shipments. Very little scrap is coming out. Sales of stove plate have been made at $9.75 to $10. The Nickel Plate list closes Jan. 27. The American Locomotive Co. has a small list closing Jan. 26.

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes	3.25c.
Soft steel bars	3.15c.
Reinforcing bars	2.95c.
Cold-fin. flats and sq.	3.65c.
Rounds and hex.	3.15c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.60c.
Bands	3.50c.
Hoops	3.90c.
Blue ann'l'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg	$2.60
Black wire, base per 100 lb.	3.20

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades:		
No. 1 heavy melting steel	$10.50 to	$11.00
No. 2 heavy melting scrap	9.00 to	9.50
Scrap rails		11.00
Hydraul. comp. sheets	9.00 to	9.50
Hand bundled sheets	8.00 to	8.50
Drop forge flashings	9.00 to	9.50
No. 1 busheling	9.00 to	9.50
Hvy. steel axle turnings	10.50 to	11.00
Machine shop turnings	5.50 to	6.00
No. 1 railroad wrought	9.00 to	9.50
Acid Open-Hearth Grades:		
Knuckles and couplers	13.50 to	14.00
Coil and leaf springs	13.50 to	14.00
Rolled steel wheels	13.50 to	14.00
Low phos. billet and bloom ends	15.00 to	15.50
Electric Furnace Grades:		
Short shov. steel turnings	8.50 to	9.00
Blast Furnace Grades:		
Short mixed borings and turnings	6.00 to	6.50
Cast iron borings	6.00 to	6.50
No. 2 busheling		6.00
Rolling Mill Grades:		
Steel car axles	15.00 to	15.50
Iron axles	16.00 to	16.50
Cupola Grades:		
No. 1 machinery cast	13.00 to	13.50
Stove plate	9.50 to	10.00
Locomotive grate bars	8.25 to	9.25
Steel rails, 3 ft. and under	15.00 to	15.50
Cast iron carwheels	13.00 to	13.50
Malleable Grades:		
Industrial	11.00 to	12.00
Railroad	11.00 to	12.00
Agricultural	11.00 to	12.00
Special Grades:		
Chemical borings	8.50 to	10.00

Plates

New inquiries were limited and involved small lots only. No awards of any size were reported. Action is expected within 10 days on 1300 tons for a pipe line in Chelan, Wash. Prices range from 2.05c., to 2.15c., c.i.f.

Shapes

The Southern Sierras Power Co., Riverside, has awarded 2000 tons for steel towers to the International Derrick Co., Torrance, and the Consolidated Steel Corpn., Los Angeles, in equal amounts. The Star Iron Works booked 210 tons for a warehouse at Bremerton, Wash., for the Puget Sound Navy Yard. The McClintic-Marshall Co. was low bidder on 270 tons for two institute buildings in San Francisco. Bids have been opened on 145 tons for the Seventh Street crossing in Oakland and on 100 tons for a school in San Francisco. Shapes range from 2.15c. to 2.25c., c.i.f.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes	3.40c.
Soft steel bars	3.40c.
Black sheets (No. 24)	4.35c.
Blue ann'l'd sheets (No. 10)	3.80c.
Galv. sheets (No. 24)	5.00c.
Struc. rivets, ½-in. and larger	5.00c.
Com. wire nails, base per keg	$3.35
Cement coat'd nails, 100 lb. keg	2.35

Cast Iron Pipe

Awards of cast iron pipe were confined to lots of less than 100 tons. Aberdeen, Wash., has opened bids on 283 tons of 4 to 8-in. Class B pipe, and Puyallup, Wash., on 169 tons of 4 and 6-in. Class B or 150 pipe.

PACIFIC COAST

Steel Sales Mostly in Small Lots, but Price Structure is Steady

SAN FRANCISCO, Jan. 24.—(*By Air Mail.*)—Sales of steel products have involved small lots for the most part. The price structure continues to hold fairly firm.

Bars

Several fair-sized lots were placed in the San Francisco district. The Truscon Steel Co. will furnish 480 tons for a school on Noe Street and W. S. Wetenhall Co. booked 200 tons for a warehouse. The latter company also secured 100 tons for a telephone building at Ripon, Cal. Unnamed interests took 100 tons for a hospital annex in Riverside. Bids have been opened on 450 tons for two institute buildings for San Francisco and bids will be opened Feb. 9 on 102 tons for a subway in Santa Ana, Cal. Los Angeles and San Francisco out-of-stock quotations are unchanged at 2.50c., base, on carload lots. Merchant bar prices appear firm at 2.25c., c.i.f., but movement is confined to unimportant lots.

Pig iron prices per gross ton at San Francisco:

*Utah basic	$22.00 to $24.00
*Utah fdy., sil. 2.75 to 3.25	22.00 to 24.00
**Indian fdy., sil. 2.75 to 3.25	22.00 to 24.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Canada

Pig Iron Orders Show a Slight Gain

TORONTO, Jan. 27. The pig iron market continues to show improvement. Melters, while buying conservatively, mostly for spot needs, are entering the market at more frequent intervals, and weekly totals are said to be increasing. Most of the improvement is due to a larger demand for iron by plants sharing in railway orders, although radiator and sanitary ware plants also have been taking better tonnages of late. Pig iron prices are unchanged.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	$22.60
No. 2 fdy., sil. 1.75 to 2.25	22.10
Malleable	22.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	$24.00
No. 2 fdy., sil. 1.75 to 2.25	23.50
Malleable	24.00
Basic	20.50

Old Material

Local dealers report some improvement. Mills are still holding pur-

chases of steel scrap to small tonnages of special grades, but foundries are increasing orders. Dealers are virtually out of the market and, as a result, have made no revision in buying prices.

Dealers' buying prices for old material

Per Gross Ton

	Toronto	Montreal
Heavy melting steel	$7.00	$6.00
Rails, scrap	7.00	6.00
No. 1 wrought	6.00	8.00
Machine shop turnings	2.00	2.00
Boiler plate	5.00	4.50
Heavy axle turnings	2.50	2.50
Cast borings	2.00	2.00
Steel borings	2.00	2.00
Wrought pipe	2.00	2.00
Steel axles	7.00	9.00
Axles, wrought iron	7.00	11.00
No. 1 machinery cast	....	10.00
Stove plate	....	8.00
Standard carwheels	....	8.50
Malleable	....	8.00

Per Net Ton

No. 1 mach'ry cast	11.00	....
Stove plate	9.00	....
Standard carwheels	10.00	....
Malleable scrap	9.00	....

YOUNGSTOWN

Further Moderate Gain in Steel Operations Expected in February

YOUNGSTOWN, Jan. 26.—As the first month of the year comes to a close, the Valley steel industry reflects more general improvement than seemed under way as developments were considered from week to week. Three blast furnaces have been placed in operation in the last two weeks and open-hearth production now stands at about 45 per cent of capacity. Furthermore, steel-making operations are better assured by the requirements of finishing mills than has been the case for several months, and only a very marked decline in specifications for finished products will prompt a reduction.

At one plant in the district, a large pipe order placed recently will require a full engagement of open-hearth capacity for two or three months, while at Warren, Ohio, a full tin mill schedule for this week and next indicates a sustained need for raw steel which has heretofore been lacking. Gradually increasing specifications from the automobile industry have also given sheet and strip units a steadier operation, with the promise of further expansion next month.

In gaging the effects of these things upon the industry as a whole, however, it is important to remember that improvement is likely to be overestimated when compared with the very low rate of activity reached during December, and that the current situation is far from satisfactory. One of the most favorable aspects is the gradual pick-up, as a sudden rush of business would undoubtedly have raised false hopes.

Local steel consuming companies are not contributing as much to the general improvement as had been expected. The building industry is slow to get under way, and apparently activity in this line must be delayed until spring. Valley mills are not equipped to take advantage of railroad tonnage, and, with the exception of pipe, must derive their principal benefits from the lighter products. Specifications for sheets and strip reflect a moderate gain, but automotive releases must improve considerably before even a 50 per cent rate is assured. At present, output of both sheet and strips averages from 40 to 45 per cent. Tin plate specifications have broadened considerably. Following the canners' convention in Chicago, releases have picked up and the expectations of the container manufacturers are optimistic. Bar mills are running at about 40 per cent, but February schedules are likely to improve. Plate production is maintained by the requirements of pipe mills, working on line pipe orders. Additional pipe tonnage is in prospect, but not for immediate placing. The additional tonnage required by the Columbia Gas & Electric Co. for its large Eastern gas line is not likely to come up until April or May. Output of buttweld pipe is at a low level and has increased only by a very small margin since the first of the year.

The strength of prices is probably the healthiest feature of the present situation, but it must be admitted that quotations are not being tested by much new buying and that shipments during this quarter are being made, in most cases, at lower levels than the present quotable market. This is particularly true on bars and plates, and to a lesser extent, on sheets and strip. While advances are predicted on the flat-rolled products for second quarter, no action is expected to be taken by local companies until the latter part of next month.

The enlarged Warren, Ohio, furnace of the Republic Steel Corpn. went into blast late last week, and one of the Hubbard stacks of the Youngstown Sheet & Tube Co. is again making iron to supply the local mold plant. No merchant furnaces are operating and none is scheduled to go in.

The pig iron market is very quiet. Some scrap buying is in prospect in the district, and, until a definite price is established, the market on heavy melting steel is nominally quotable at $12.50 to $13. Compressed sheets are 50c. a ton lower, although Detroit material could not be brought to the Valleys at this level.

CINCINNATI

Pig Iron Demand Mostly for Small Lots —Scrap Market Firmer

CINCINNATI, Jan. 27.—Pig iron sales in the week totaled about 2100 tons, mostly in small lots for nearby shipment. Forward buying is rare. The price situation is still affected by uncertainty, as reports of low quotations on both Northern and Southern iron continue to be heard. Foundries generally have not felt any improvement in demand and the melt still is low. Of the past week's business, 150 tons went to Southern furnaces in small lots. Of the remainder, which went to Northern furnaces, 500 tons bought by a southern Ohio consumer was the only sizable order.

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
New billet reinforc. bars	3.15c.
Rail steel reinforc. bars	3.00c.
Hoops	3.90c.
Bands	3.35c.
Cold-fin. rounds and hex.	3.80c.
Squares	4.30c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.45c.
Structural rivets	4.20c.
Small rivets	60 per cent off list
No. 9 ann'l'd wire, per 100 lb.	$3.00
Com. wire nails, base per keg (25 kegs or more)	2.95
Cement c't'd nails, base 100 lb. keg	2.95
Chain, per 100 lb.	10.25
	Net per 100 Ft.
Lap-welded steel boiler tubes, 2-in.	$16.50
4-in.	34.50
Seamless steel boiler tubes, 2-in.	17.50
4-in.	36.00

Finished Steel

The demand for sheets has tapered slightly. Production has been curtailed this week.

Prices per gross ton, deliv'd Cincinnati:

Ala. fdy., sil. 1.75 to 2.25	$14.19	to $14.69
Ala. fdy., sil. 2.25 to 2.75	14.69	to 15.19
Tenn. fdy., sil. 1.75 to 2.25	14.19	to 14.69
S'th'n Ohio silvery, 8 per cent	24.39	

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Old Material

The award of recent railroad lists at good prices has brought a better feeling in the district market. Except for an increase of 50c. in dealers' bids on cast iron borings, the present schedule is unchanged, but the undertone appears to be firmer.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel	$10.00	to $10.50
Scrap rails for melting	10.50	to 11.00
Loose sheet clippings	5.50	to 6.00
Bundled sheets	8.75	to 9.25
Cast iron borings	4.50	to 5.00
Machine shop turnings	5.00	to 5.50
No. 1 busheling	8.00	to 8.50
No. 2 busheling	4.50	to 5.00
Rails for rolling	11.50	to 12.00
No. 1 locomotive tires	11.00	to 11.50
No. 2 railroad wrought	9.50	to 10.00
Short rails	14.75	to 15.25
Cast iron carwheels	10.50	to 11.00
No. 1 machinery cast	14.00	to 14.50
No. 1 railroad cast	12.00	to 12.50
Burnt cast	6.50	to 7.00
Stove plate	6.50	to 7.00
Brake shoes	6.50	to 7.00
Agricultural malleable	12.00	to 12.50
Railroad malleable	13.00	to 13.50

BOSTON

Pig Iron Sales Small—Scrap Still Dull—Cast Iron Pipe Active

BOSTON, Jan. 27.—Pig iron sales the past week approximated 1500 tons, of which the Mystic Iron Works took more than half, and a Buffalo furnace a goodly portion of the remainder. A small lot of charcoal iron was sold to a Connecticut melter. The Mystic Iron Works took the largest individual order, 500 tons for delivery as the foundry requires. The Rhode Island Malleable Iron Co., the General Electric Co. and a New Haven, Conn., melter, whose inquiries total 3400 tons, have not covered. The Buffalo iron market seems a little firmer, no sales having been made recently at less than $16 a ton, furnace, for No. 2X, or less than $16.50 for No. 1. There is, however, a small tonnage of distress iron on the market.

Foundry iron prices per gross ton deliv'd to most New England points:

*Buffalo, sil. 1.75 to 2.25	$19.91 to $20.91
*Buffalo, sil. 2.25 to 2.75	19.91 to 20.91
*Ala., sil. 1.75 to 2.25	21.11
*Ala., sil. 2.25 to 2.75	21.61
†Ala., sil. 1.75 to 2.25	17.25
†Ala., sil. 2.25 to 2.75	17.75

Freight rates: $4.91 all rail from Buffalo; $9.61 all rail from Alabama and $5.75 rail and water from Alabama to New England seaboard.
*All rail rate.
†Rail and water rate.

Reinforcing Steel

Business is almost at a standstill, sales the past week falling under 200 tons. Despite the lack of sales, the billet steel bar market is firm at 3c. a lb., base, from stock for 1 to 5-ton lots; at 2.50c. to 2.55c. for 6 to 99-ton lots, and at 2.30c. for 100-ton and larger lots. Rail steel bars are 2.26½c. a lb., delivered Boston rate points.

Cast Iron Pipe

Portland, Me., has awarded 394 tons of Class B cement-lined, 20-in. pipe, 625 tons of 16-in., 205 tons of 12-in., 238 tons of 8-in. and 167 tons of 6-in., a total of 1629 tons, to R. D. Wood & Co. Waltham, Mass., has placed about 100 tons of 8-in. pipe with the Warren Foundry & Pipe Co., while Woonsocket, R. I., has purchased its 1931 requirements from the United States Pipe & Foundry Co. It is expected that Stone & Webster, Inc., will place a substantial order for 6, 8 and 12-in. pipe this week, and Charles H. Tenney & Co. a sizable order for 4, 6 and 8-in. stock. Mansfield, Mass., is considering bids on 649 tons of pipe, and Framingham, Mass., on 100 tons of 6-in. and 100 tons of 8-in. The market for pipe is still on a basis of $36 a ton, f.o.b. foundry, for 6-in. and larger dimensions. A $3 differential is asked on Class A and gas pipe.

Fabricated Steel

Awards of fabricated structural steel the past week totaled not more than 300 tons. The current week gives indications of being more active, as it is expected the Boston Post Office, requiring more than 10,000 tons, a plant for the New England Telephone & Telegraph Co. at Watertown, Mass., calling for 400 tons, a New London, Conn., Coast Guard unit of 500 tons, and possibly one or two smaller jobs will be let. Massachusetts closes bids Jan. 29 on a 60-in. fabricated pipe between Weston and Brookline, Mass., involving a sizable tonnage of plates.

Old Material

Aside from an advance of 25c. a ton on No. 2 steel to $5.80 on cars shipping point, old material prices have not changed. Light buying of No. 2 scrap and of No. 1 heavy melting steel and breakable cast for Pennsylvania delivery, and of long bundled skeleton for Worcester, Mass., delivery constitutes the principal activity.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$7.00 to $7.50
Scrap T rails	6.60 to 7.10
Scrap girder rails	5.60 to 6.10
No. 1 railroad wrought	7.00 to 7.50
Machine shop turnings	2.00 to 2.60
Cast iron borings (steel works and rolling mill)	2.00 to 2.60
Bundled skeleton, long	5.75 to 6.10
Forge flashings	5.75 to 6.10
Blast furnace borings and turnings	2.00 to 2.60
Forge scrap	5.60 to 6.10
Shafting	12.50 to 13.50
Steel car axles	14.00 to 15.00
Wrought pipe, 1 in. in diameter over 2 ft. long	6.50 to 7.00
Rails for rolling	8.50 to 9.00
Cast iron borings, chemical	9.00 to 9.60
No. 2 cast	5.10 to 5.60

Prices per gross ton deliv'd consumers' yards:

Textile cast	$10.50 to $11.00
No. 1 machinery cast	11.50 to 12.00
Stove plate	7.00 to 7.25
Railroad malleable	13.00 to 13.50

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.36½c.
Structural shapes—	
Angles and beams	3.36½c.
Tees	3.36½c.
Zees	3.36½c.
Soft steel bars, small shapes	3.26½c.
Reinforcing bars	3.11½c. to 3.26½c.
Iron bars—	
Refined	3.26½c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tire steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex	3.50c. to 5.50c.
Squares and flats	4.00c. to 6.00c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.80c.

	Per Cent Off List
Machine bolts	60 and 5
Carriage bolts	60 and 5
Lag screws	60 and 5
Hot-pressed nuts	60 and 5
Cold-punched nuts	60 and 5
Stove bolts	70 and 10

Fabricated Steel Orders Gain in Week of Jan. 10

WASHINGTON, Jan. 26.—Orders for fabricated structural steel in the week ended Jan. 10 totaled 20,514 tons, according to reports received by the Bureau of the Census from 104 establishments. Operations were at the rate of 48.5 per cent of capacity. Bookings in the week ended Jan. 3 totaled only 13,050 tons, or 29.5 per cent of the capacity of the 116 reporting plants.

Shipments in the week ended Jan. 10 were 16,676 tons, or 40.9 per cent of the capacity of the 101 reporting fabricators, against 15,611 tons in the previous week reported by 114 plants, representing 35.3 per cent of their capacity.

Gray Iron Castings Orders Gained in December

Orders for gray iron castings during December showed quite an increase over those of November, according to the monthly report of the Gray Iron Institute. New business taken last month, based on reports from 78 foundries, was 47.2 per cent of normal, compared with 37.1 per cent in November. Production, based on 151 reports, was 48.5 per cent of normal during December, compared with 50.6 per cent in November, and unfilled orders, based on 69 reports, were 36.2 per cent in December as against 24.2 per cent in November. Reports of the business outlook were somewhat more favorable than those made a month ago.

Bethlehem to Appeal in Sheet & Tube Case

E. G. Grace, president, Bethlehem Steel Corpn., announced on Jan. 24 that the Bethlehem company would take an appeal from the decision of Judge David G. Jenkins of the Common Pleas Court at Youngstown in the case involving the acquisition of the Youngstown Sheet & Tube Co. The Sheet & Tube company also has voted to appeal from the decision.

Directors of the Chicago & Eastern Illinois Railroad have authorized the scrapping of about 7000 obsolete freight cars.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and under 10-in., Pittsburgh	$30.00
Rerolling, 4-in. and under 10-in., Youngstown	30.00
Rerolling, 4-in. and under 10-in., Cleveland	30.00
Rerolling, 4-in. and under 10-in., Chicago	32.00
Forging quality, Pittsburgh	36.00

Sheet Bars

(Open Hearth or Bessemer)

	Per Gross Ton
Pittsburgh	$30.00
Youngstown	30.00
Cleveland	30.00

Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	$30.00
Youngstown	30.00
Cleveland	30.00

Skelp

(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.65c.
Universal	1.65c.
Sheared	1.65c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$35.00
Cleveland	35.00
Chicago	35.00

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore low phos., copper free, 55 to 58% iron in dry Spanish or Algeria	8c. to 9c.
Iron ore, low phos., Swedish, average 68% iron	10.00c.
Iron ore, basic or foundry, Swedish, average 65% iron	9.00c.
Manganese ore, washed 52% manganese, from the Caucasus	25c. to 27c.
Manganese ore, African or Indian, 50 to 52%	24c. to 26c.
Manganese ore, Brazilian, 46 to 48%	22c. to 24c.
Tungsten ore, high grade, per unit, in 60% concentrates	$12.00 to $12.25

	Per Gross Ton
Chrome ore, 45% Cr.O. crude, c.i.f. Atlantic seaboard	$20.00
Chrome ore, 48% Cr.O. crude, c.i.f. Atlantic seaboard	$22.50

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.50
Foundry, f.o.b. Connellsville prompt	$3.25 to 4.75
Foundry, by-products, Ch'go ovens	8.00
Foundry, by-products, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, by-product, Phila.	9.00
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.35 to $1.50
Mine run coking coal, f.o.b. W. Pa. mines	1.40 to 1.50
Gas coal, ¾-in., f.o.b. Pa. mines	1.70 to 1.80
Mine run gas coal, f.o.b. Pa. mines	1.50 to 1.60
Steam slack, f.o.b. W. Pa. mines	.65 to .75
Gas slack, f.o.b. W. Pa. mines	1.00 to 1.15

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	$80.00 to $85.00
Foreign, 80%, Atlantic or Gulf port, duty paid	00.00 to 00.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$28.00 to $30.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50
75%	130.00

	Per Gross Ton Furnace		Per Gross Ton Furnace
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	39.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
10%	$25.00	13%	$29.00
11%	26.00	14%	31.00
12%	27.00	15%	33.00

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
6%	$21.00	11%	$24.00
7%	21.50	12%	25.00
8%	22.00	13%	27.00
9%	22.50	14%	29.00
10%	23.00	15%	31.00

Delivered prices at Chicago are about 50c. a ton below this schedule.

Other Ferroalloys

Ferrotungsten, per lb. contained metal del'd, carloads	$1.08
Ferrotungsten, less carloads	$1.15 to 1.25
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrochromium, 2% carbon	17.00c. to 17.50c.
Ferrochromium, 1% carbon	19.00c. to 20.00c.
Ferrochromium, 0.10% carbon	24.50c. to 26.00c.
Ferrochromium, 0.06% carbon	26.50c. to 28.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$160.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base per gross ton	$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton	$122.50
Silico-manganese, gross ton, delivered	$185.00

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines	$15.00 to $16.00
No. 2 lump, Illinois and Kentucky mines	$17.00 to 18.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic port, duty paid	$17.00 to 17.50
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	32.50

Fire Clay Brick

Per 1000 f.o.b. Works

	High-Heat Duty Brick	Intermediate Heavy Duty Brick
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	.....
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fireclay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	73
†Carriage bolts	73
Lag bolts	73
Plow bolts, Nos. 1, 2, 3 and 7 heads	73
Hot-pressed nuts, blank or tapped, square	73
Hot-pressed nuts, blank or tapped, hexagons	73
C.p.c. and t. square or hex. nuts, blank or tapped	73
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅝ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	73
Semi-finished hexagon castellated nuts, S.A.E.	73
Stove bolts in packages, P'gh.	80, 10, 10 and 5
Stove bolts in packages, Chicago	80, 10, 10 and 5
Stove bolts in packages, Cleveland	80, 10, 10 and 5
Stove bolts in bulk, P'gh.	80, 10, 10, 5 and 2½
Stove bolts in bulk, Chicago	80, 10, 10, 5 and 2½
Stove bolts in bulk, Cleveland	80, 10, 10, 5 and 2½
Tire bolts	60, 10 and 10

Discounts of 73 per cent off on bolts and nuts apply on carload business with jobbers and large consumers.

Large Rivets

(½-in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$2.75
F.o.b. Chicago	2.85

Small Rivets

(⅞-in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70, 10 and 5
F.o.b. Cleveland	70, 10 and 5
F.o.b. Chicago	70, 10 and 5

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10, 10 and 5
Milled standard set screws, case hardened,	80 and 5
Milled headless set screws, cut thread	75 and 10
Upset hex. head cap screws, U.S.S.S. thread,	85 and 10
Upset hex. cap screws, S.A.E. thread	85 and 10
Upset set screws	80, 10 and 5
Milled studs	70

▲▲▲ Mill Prices of Finished Iron and Steel Products ▲▲▲

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill	1.65c.
F.o.b. Chicago	1.75c.
Del'd Philadelphia	1.94c.
Del'd New York	1.93c.
F.o.b. Cleveland	1.70c.
F.o.b. Lackawanna	1.75c.
F.o.b. Birmingham	1.80c.
C.i.f. Pacific ports	2.25c.
F.o.b. San Francisco mills	2.25c.

Billet Steel Reinforcing

F.o.b. P'gh mills, 40, 50, 60-ft.	1.75c.
F.o.b. Birmingham, mill lengths	1.75c. to 1.80c.

Rail Steel

F.o.b. mills, east of Chicago dist.	1.50c. to 1.55c.
F.o.b. Chicago Heights mill	1.60c. to 1.65c.
Del'd Philadelphia	1.84c. to 1.89c.

Iron

Common iron, f.o.b. Chicago	1.75c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.09c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.65c.
F.o.b. Chicago	1.75c.
F.o.b. Birmingham	1.80c.
Del'd Cleveland	1.83½c.
Del'd Philadelphia	1.85½c.
F.o.b. Coatesville	1.75c.
F.o.b. Sparrows Point	1.75c.
F.o.b. Lackawanna	1.75c.
Del'd New York	1.93c.
C.i.f. Pacific ports	2.05c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.65c.
F.o.b. Chicago	1.75c.
F.o.b. Birmingham	1.80c.
F.o.b. Lackawanna	1.75c.
F.o.b. Bethlehem	1.75c.
Del'd Cleveland	1.83½c.
Del'd Philadelphia	1.76c.
Del'd New York	1.90½c.
C.i.f. Pacific ports	2.15c. to 2.25c.

Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
6 in. and narrower, P'gh	1.65c.
Wider than 6 in., P'gh	1.55c.
6 in. and narrower, Chicago	1.75c.
Wider than 6 in., Chicago	1.65c.
Cooperage stock, P'gh	1.90c.
Cooperage stock, Chicago	2.00c.

Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.10c.
Bars, f.o.b. Chicago	2.10c.
Bars, Cleveland	2.10c.
Bars, Buffalo	2.10c.
Shafting, ground, f.o.b. mill	*2.45c. to 3.40c.
Strips, P'gh	2.25c. to 2.35c.
Strips, Cleveland	2.25c. to 2.35c.
Strips, deliv'd Chicago	2.53c. to 2.63c.
Strips, Worcester	2.50c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland	3.40c.

*According to size.

Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

To Merchant Trade

	Base per Keg
Standard wire nails	$1.90 to $2.00
Cement coated nails	1.90 to 2.00
Galvanized nails	3.95 to 4.05
	Base per Lb.
Polished staples	2.35c. to 2.45c.
Galvanized staples	2.60c. to 2.70c.
Barbed wire, galvanized	2.55c. to 2.65c.
Annealed fence wire	2.05c. to 2.15c.
Galvanized wire, No. 9	2.50c. to 2.60c.
Woven wire fence (per net ton to retailers)	$65.00

To Manufacturing Trade

Bright hard wire, Nos. 6 to 9 gage	2.20c. to 2.30c.
Spring wire	3.20c. to 3.30c.

(Carload lots, Chicago district mills)

Wire nails	$1.95 to $2.05
Annealed fence wire	2.30c. to 2.40c. (lb.)
Bright hard wire to manufacturing trade	2.25c. to 2.35c.
Barbed wire, galv.	2.60c. (lb.)

Anderson, Ind., mill prices are ordinarily $1 a ton over Pittsburgh base; Duluth, Minn., and Worcester, Mass., mill $2 a ton over Pittsburgh, and Birmingham mill $3 a ton over Pittsburgh.

Light Plates

	Base per Lb.
No. 10, blue annealed, f.o.b. P'gh	1.90c.
No. 10, blue annealed, f.o.b. Chicago dist.	2.00c.
No. 10, blue annealed, del'd Phila.	2.19c.
No. 10, blue annealed, B'ham	2.05c.

Sheets

Blue Annealed

	Base per Lb.
No. 13, f.o.b. P'gh	2.05c.
No. 13, f.o.b. Chicago dist.	2.15c.
No. 13, del'd Philadelphia	2.34c.
No. 13, blue annealed, B'ham	2.20c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.35c.
No. 24, f.o.b. Chicago dist. mill	2.45c.
No. 24, del'd Philadelphia	2.64c.
No. 24, f.o.b. Birmingham	2.50c.

Steel Furniture Sheets

No. 24, f.o.b. P'gh	3.60c.

Galvanized

No. 24, f.o.b. Pittsburgh	2.90c. to 3.00c.
No. 24, f.o.b. Chicago dist. mill	3.00c. to 3.10c.
No. 24, del'd Cleveland	3.08½c. to 3.18½c.
No. 24, del'd Philadelphia	3.24c. to 3.29c.
No. 24, f.o.b. Birmingham	3.15c.

Continuous Mill Sheets

No. 10 gage	1.75c.
No. 13 gage	1.90c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.60c. to 2.70c.
No. 28, f.o.b. Chicago dist. mill	2.75c. to 2.80c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	3.80c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill	3.35c. to 3.45c.

Vitreous Enameling Stock

No. 24, f.o.b. Pittsburgh	3.70c.

Tin Plate

	Base per Box
Standard cokes, f.o.b. P'gh district mills	$5.00
Standard cokes, f.o.b. Gary	5.10

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)

(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$10.30
15-lb. coating I.C.	12.90
20-lb. coating I.C.	14.00
25-lb. coating I.C.	$15.20
30-lb. coating I.C.	16.00
40-lb. coating I.C.	17.80

Alloy Steel Bars

(F.o.b. maker's mill)

Alloy Quantity Bar Base, 2.65c. per Lb.

S.A.E. Series Numbers		Alloy Differential
2000	(½% Nickel)	$0.25
2100	(1¼% Nickel)	0.55
2300	(3½% Nickel)	1.50
2500	(5% Nickel)	2.25
3100	Nickel Chromium	0.55
3200	Nickel Chromium	1.35
3300	Nickel Chromium	3.80
3400	Nickel Chromium	3.20
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100	Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100	Chromium Spring Steel	0.20
6100	Chromium Vanadium Bar	1.20
6100	Chromium Vanadium Spring Steel	0.95
9250	Silicon Manganese Spring Steel (flats)	0.25
	Rounds and squares	0.50
Chromium Nickel Vanadium		1.50
Carbon Vanadium		0.95

Above prices are for hot-rolled steel bars, forging quality. The differential for cold-drawn bars is ¾c. a lb. higher, with standard classification for cold-finished alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a sectional area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2½ in. thick, regardless of sectional area, take the bar price.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	34.00
Light (from rail steel), f.o.b. mill	32.00
Light (from billets, f.o.b. Ch'go mill	36.00

Track Equipment

	Base per 100 Lb.
Spikes, ⅝ in. and larger	$2.80
Spikes, ½ in. and larger	2.80
Spikes, boat and barge	$3.00
Tie plate, steel	1.95
Angle bars	2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	73 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	47	21½	¼ and ⅜	+11	+36
¼ to ⅜	53	27½	½	23	5
½	58	44½	¾	28	11
¾	62	50½	1 and 1¼	31	15
1 to 3	64	52½	1½ and 2	35	18

Lap Weld

2	57	45½	2	23	9
2½ to 6	61	49½	2½ to 3½	28	13
7 and 8	58	45½	4 to 6	30	17
9 and 10	56	43½	7 and 8	29	16
11 and 12	55	42½	9 to 12	26	11

Butt Weld, extra strong, plain ends

⅛	43	26½	¼ and ⅜	+13	+48
¼ to ⅜	49	32½	½	23	7
½	55	44½	¾	28	12
¾	60	49⅛	1 to 2	34	18
1 to 1½	62	51½			
2 to 3	63	52½			

Lap weld, extra strong, plain ends

2	55	44½	2	29	13
2½ to 4	59	48½	2½ to 4	34	20
4½ to 6	58	47½	4½ to 6	33	19
7 to 8	54	41½	7 and 8	31	17
9 and 10	47	34½	9 to 12	21	8
11 and 12	46	33½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discount of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		Charcoal Iron	
2 in. and 2¼ in.	38	1½ in.	1
2½ in.—2¾ in.	46	1¾ in.	8
3 in.	52	2 in.—2¼ in.	13
3¼ in.—3¾ in.	54	2½ in.—2¾ in.	16
4 in.	57	3 in.	17
4½ in. to 6 in.	46	3¼ in to 3½ in.	18
		4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	61	3 in.	46
1¼ to 1½ in.	53	3¼ to 3½ in.	48
1¾ in.	37	4 in.	51
2 to 2¼ in.	32	4½, 5 and 6 in.	40
2½ to 2¾ in.	40		

Hot Rolled

2 and 2¼ in.	38	3¼ to 3½ in.	54
2½ and 2¾ in.	46	4 in.	57
3 in.	52	4½, 5 and 6 in.	46

Beyond the above base discount a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb., base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gages take the mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30% base (carloads)	55
Carbon, 0.30% to 0.40% base	50

Plus differential for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

Steel Corporation Earns 70c. a Share

Net income equivalent to 70c. a share of common stock was shown in the report for the fourth quarter of 1930 of the United States Steel Corpn., after providing for the preferred stock dividend. Total net income was $12,366,088 and the number of common shares outstanding was 8,689,180. Earnings in the third quarter were $2.06 a common share, while those for the second and first quarters were $3.01 and $3.11 respectively.

Total earnings for the fourth quarter were $23,083,791. After allowance for depletion, depreciation and obsolescence and interest on bonds, the balance was $8,970,662. This balance was increased to $12,366,088 by special income of $3,695,426, representing the quarterly apportionment of net interest on Federal tax refunds and net adjustments in various accounts. After allowing for preferred and common stock dividends totaling $21,510,985 the deficit for the quarter was $9,144,897. The surplus for the year 1930, at $18,891,675, compares with $28,036,572 for the first nine months of the year.

Jones & Laughlin's Deficit $1,464,139 in Quarter

The Jones & Laughlin Steel Corpn., Pittsburgh, in the year ended Dec. 31, 1930, had net income, after deductions for depreciation and depletion, reserves, bond interest, Federal taxes, etc., of $0,093,287, compared with $20,848,749 in the previous year. Additions to surplus during 1930 amounted to $2,101,714, compared with $12,128,174 in 1929. Surplus as of Dec. 31, 1930, stood at $74,749,352, against $72,897,638 one year before.

Net income in the final quarter of 1930 amounted to $283,754, resulting in a deficit of $1,464,139 after common and preferred stock dividends due during the quarter were paid. Dividends of 1¾ per cent on preferred and 1 per cent on common were declared.

Mining Engineers Prepare for February Meeting

The program for the 140th meeting of the American Institute of Mining and Metallurgical Engineers, to be held in the Engineering Societies Building, New York, Feb. 16 to 19, is rapidly rounding into shape.

The iron and steel division of the institute will hold five sessions—two on physical metallurgy, a general session, one on blast furnace research and a round-table on iron ore.

A symposium on the working of metals is planned by the institute of metals division, which will include two sessions. Besides these there will be a general session. At the annual dinner of the division, which will be held this year at the Hotel New Yorker, Dr. G. W. Thompson, chief chemist of the National Lead Co., New York, will be the principal speaker.

Dr. F. F. Lucas of the Bell Telephone Laboratories, Inc., will deliver the annual Howe memorial lecture of the A. I. M. and M. E., and his subject will be "The Art of Metallography." The annual institute of metals lecture will be delivered by Dr. Arne Westgren, a prominent metallurgist of Stockholm, Sweden, whose subject will be "X-Ray Determination of Alloy Equilibrium Diagrams."

French Pipe Maker Buys New Castle, Pa., Property

The Intercontinental Pipe & Mining Co., 122 East Forty-second Street, New York, formed in the United States by the Pont-a-Mousson works, French manufacturer of cast iron pipe, has acquired the property at New Castle, Pa., of the former Penn Seaboard Steel Corpn. The company has abandoned its original plan to construct a pipe plant at Chelsea, Mass., near the Mystic blast furnace, and will develop the old Penn Seaboard plant to have an ultimate capacity of 150,000 tons of centrifugal cast iron pipe annually. Special centrifugal casting equipment has been built at the works in Pont-a-Mousson, France, for shipment to the foundry at New Castle, Pa.

Pig Iron Imports Drop Considerably

Imports of pig iron into the United States in December are reported at 13,881 gross tons, a drop of almost 21 per cent from the November total. In a year of small imports, however, the December volume represented a little more than one-tenth of the year's total, which was 137,739 tons.

With one exception, the 1930 imports of pig iron were the smallest since 1921. Nineteen hundred and twenty-seven had a smaller total by about 4 per cent. However, the imports of the last four years have been fairly uniform, no year falling below 132,000 tons and none going above 148,000 tons.

Last year India supplied about 78½ per cent of the total tonnage, compared with somewhat less than 50 per cent in 1929. To offset this increase of over 39,000 tons in imports from India, there has been a heavy shrinkage in quantities from other sources of supply. Incoming shipments from the United Kingdom dropped off almost two-thirds, and those from Netherlands almost three-fourths, the two together representing a loss of nearly 43,000 tons.

UNITED STATES IMPORTS OF PIG IRON BY COUNTRIES OF SHIPMENT
(In Gross Tons)

	December		12 Months Ended December	
	1930	1929	1930	1929
India	13,591	8,798	108,261	68,968
United Kingdom	95	4,002	14,239	29,140
Germany	----	----	50	102
France	----	----	----	101
Netherlands	47	2,760	6,243	24,189
Sweden	49	260	4,183	3,534
Norway	51	307	3,227	3,400
Canada	48	45	664	7,382
Belgium	----	----	669	284
All others	----	----	203	662
Total	13,881	17,172	137,739	147,763

Yale & Towne Mfg. Co. to Concentrate Manufacturing

The Yale & Towne Mfg. Co., Stamford, Conn., has announced a plan of concentration of manufacturing activities. A part of the builders' hardware business will be moved to North Chicago, while all of the manufacturers of material-handling equipment will be concentrated at Philadelphia. The executive offices of the company will be moved to New York City. The Stamford plant will hereafter be operated at the branch factory. About $1,000,000 worth of shop equipment will be moved from Stamford to Philadelphia. Walter C. Allen, president of the company, announces that these changes are made in the interest of economy.

Baldwin-Southwark Corpn., which has succeeded to the Southwark Foundry & Machine Co., Philadelphia, has moved its new plant to Eddystone, Pa., vacating the Philadelphia site, which it had occupied for 94 years. The company recently became closely affiliated with the Baldwin Locomotive Works; hence the change in name.

Illinois Testing Laboratories, Inc., 131 W. Austin Avenue, Chicago, has appointed the James H. Knapp Co., 4920 Loma Vista Avenue, Los Angeles, with a branch in San Francisco, as its exclusive Pacific Coast distributer.

Federal Press Co., Elkhart, Ind., manufacturer of punch presses, has appointed the Marshall & Huschart Machinery Co., 571 Washington Boulevard, Chicago, as its exclusive representative in the Chicago territory.

▲▲▲ Non-Ferrous Metal Markets ▲▲▲

Copper Easier—Tin Stagnant —Lead Quiet—Zinc Firmer

NEW YORK, Jan. 27

Copper

Offerings of metal by dealers have somewhat weakened the market, although quotations are generally unchanged. From one source about 2000 tons is reported to have been offered at concessions from the prevailing price of 10c. down to 9.75c., delivered in the Connecticut Valley. So far as can be learned, the quotation of custom smelters is unchanged at 10c. for spot and future delivery. Primary producers are still out of the market, but specifications on their contracts are said to be quite satisfactory. Domestic demand is exceedingly light, and there has been a marked let-up in purchasing for foreign shipment. It is estimated that the total foreign sales for the month will be between 30,000 and 35,000 tons. There are indications that the slackening in demand is not taking care of the intake of custom smelters and, although it is believed by some that the 10c. level will not be lowered, there is always the possibility in such circumstances that it may be sacrificed. Lake copper is in light demand at 10c. to 10.12½c., delivered.

Tin

With practically no demand reported, the market is stagnant. There is almost no buying, even for early delivery by small consumers. Prices during the week have fluctuated but little. Spot Straits tin is quoted at 26c., New York, today, and London quotations are very little changed from those of a week ago, with spot standard held at £115, future standard at £116 10s., and spot Straits at £119. The Singapore price today was £118 17s. 6d. Stocks in British warehouses on Jan. 24 were 23,540 tons, an increase for the week of 312 tons. Shipments from the Straits for the month to Jan. 24, inclusive, were 6145 tons.

Lead

The market is without feature and demand is still light, being confined to carload and small lots for early delivery. Despite lower prices in London, quotations here are unchanged at 4.55c., St. Louis, or 4.75c., New York, the latter being the contract price of the leading producer.

Zinc

Due to greater tightness in the ore position, the market for prime Western is a little firmer. Smelters are finding difficulty in buying ore at prevailing quotations of 826, Joplin, and with the surplus of 49,800 tons strongly held, higher prices are imminent. Better inquiry for prime Western is reported, particularly for futures, with bids of 4c., East St. Louis, for March, April and May. These, however, have been declined, with producers asking about 4.10c. for March and 4.12½c. to 4.15c. for April and May. Prompt metal is quoted at 4c. to 4.05c., with 4.05c. for February.

Antimony

With demand from consumers a little heavier and with sellers willing to meet this demand, prices for Chinese metal are a little lower at 7.25c., New York, duty paid, for prompt shipment, with futures at 7.12½c.

Nickel

Wholesale lots of ingot nickel are quoted at 35c. a lb., with shot nickel at 36c. and electrolytic nickel in cathodes at 35c.

Aluminum

Virgin metal, 98 to 99 per cent pure, is obtainable at the published price of 22.90c. a lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, Jan. 27.—Sales of non-ferrous metals are small both in number and in aggregate tonnage. Quotations for copper are steady, while prices for tin are off ½c. The old metal market is listless.

Prices per lb. in carload lots: Lake copper, 10.12½c.; tin, 26.50c.; lead, 4.65c.; zinc, 4.12½c.; in less-than-car-

THE WEEK'S PRICES—CENTS PER POUND FOR EARLY DELIVERY

	Jan. 27	Jan. 26	Jan. 24	Jan. 23	Jan. 22	Jan. 21
Lake copper, New York	10.12½	10.12½	10.12½	10.12½	10.12½	10.12½
Electrolytic copper, N. Y.*	9.75	9.75	9.75	9.75	9.75	9.75
Straits tin, spot, N. Y.	26.00	25.62½		26.00	25.87½	26.37½
Zinc, East St. Louis	4.00	4.00	4.00	4.00	4.00	4.00
Zinc, New York	4.30	4.27	4.30	4.30	4.35	4.35
Lead, St. Louis	4.55	4.55	4.55	4.55	4.50	4.50
Lead, New York	4.75	4.75	4.75	4.75	4.75	4.75

*Refinery quotations; price 1½c. higher delivered in the Connecticut Valley.

New York, Chicago or Cleveland Warehouse

Delivered Prices, Base per Lb.

High brass	17.12½c.
*Copper, hot rolled, base sizes	19.75c.
Seamless Tubes—	
Brass	22.00c.
Copper	21.12½c.
Brass Rods	15.37½c.
Brazed Brass Tubes	24.67½c.

*Extra for cold-rolled, 3c. per lb.

New York Warehouse

Delivered Prices, Base per Lb.

Zinc sheets (No. 9), casks	9.75c. to 10.25c.
Zinc sheets, open	10.75c. to 11.25c.

Metals from New York Warehouse

Delivered Prices, per Lb.

Tin, Straits pig	29.00c. to 30.00c.
Tin, bar	30.00c. to 31.00c.
Copper, Lake	11.25c. to 11.75c.
Copper, electrolytic	11.00c. to 11.50c.
Copper, casting	10.75c. to 11.25c.
Zinc, slab	5.50c. to 6.50c.
Lead, American pig	5.87½c. to 6.87½c.
Lead, bar	7.87½c. to 8.87½c.
Antimony, Asiatic	10.00c. to 10.50c.
Aluminum No. 1 ingots for remelting (guaranteed over 99% pure)	24.00c. to 25.00c.
Alum. ingots, No. 12 alloys	23.00c. to 24.00c.
Babbitt metal, commercial grade	25.00c. to 35.00c.
Solder, ½ and ½	19.75c. to 20.75c.

Metals from Cleveland Warehouse

Delivered Prices, per Lb.

Tin, Straits pig	31.00c.
Tin, bar	33.00c.
Copper, Lake	11.13c.
Copper, electrolytic	11.13c.
Copper, casting	10.75c.
Zinc, slab	5.50c.
Lead, American pig	5.35c. to 5.60c.
Lead, bar	8.25c.
Antimony, Asiatic	11.00c.
Babbitt metal, medium grade	15.25c.
Babbitt metal, high grade	34.00c.
Solder, ½ and ½	19.75c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged consumers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	8.25c.	9.25c.
Copper, hvy. and wire	8.00c.	9.00c.
Copper, light and bottoms	7.00c.	8.00c.
Brass, heavy	4.75c.	5.75c.
Brass, light	4.00c.	5.00c.
Hvy. machine composition	7.00c.	7.75c.
No. 1 yel. brass turnings	5.00c.	5.50c.
No. 1 red brass or comps. turnings	6.25c.	7.25c.
Lead, heavy	3.50c.	4.00c.
Lead, tea	2.00c.	2.50c.
Zinc	2.00c.	2.50c.
Sheet aluminum	7.50c.	9.50c.
Cast aluminum	5.00c.	7.50c.

load lots, antimony, 8.25c. On old metals we quote copper wire, crucible shapes and copper clips, 7.75c.; copper bottoms, 6.75c. to 7.25c.; red brass, 6.75c. to 7.25c.; yellow brass, 4.75c. to 5.25c.; lead pipe, 3.75c. to 4c.; zinc, 1.25c. to 1.50c.; pewter, No. 1, 14.75c.; tin-foil, 15.75c.; block tin, 21.75c.; aluminum, 6.25c. to 6.75c.; all being dealers' prices for less-than-carload lots.

Reinforcing Steel

Chicago Post Office Will Require 5000 Tons

REINFORCING steel awards the past week held up to the volume of those in the previous week and again totaled 6000 tons. The largest letting was 2800 tons for a merchandise mart at St. Louis. New jobs call for 7100 tons, 5000 tons of which will be used in a Post Office at Chicago. Awards follow:

WORCESTER, MASS., 118 tons, high school, to New England Structural Co.

NEW YORK, 750 tons, West Side Highway, awarded by Frederick Snare Corp. to National Bridge Works.

NEW YORK, 500 tons, to James Stewart & Co., and 500 tons to H. H. Sherwin & Co., jobbers.

BOSTON, MASS., Auditorium, 500 tons, steel already specified, to Bethlehem Steel Co.

SCHENECTADY, N. Y., 400 tons, factory building, to Lehigh Structural Steel Co., Bethlehem.

WASHINGTON, 400 tons, warehouse for U. S. Rubber Co., to Capital Fireproofing Co.

NEW YORK, 800 tons, International House, Riverside Drive, to Joseph T. Ryerson & Son, Inc.

NEW YORK, 2000 tons, Metropolitan Museum addition, between Lexington Avenue and Fifth Avenue, to Kalman Steel Co.

BOSTON, MASS., Post Office, 500 tons, State Guard Armory, to Hedley-Peirce Co.

NEW YORK, 200 tons, warehouse, Sands and Water Streets, to W. S. Arrowsmith Co.

NEW YORK, 150 tons, school on Nagle Street, to Truscon Steel Co.

BRONX, N. Y., 100 tons, milk plant, to W. S. Arrowsmith Co.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

ALTOONA, PA., PENNSYLVANIA, tonnage not given, penitentiary. Great Lakes Dredge & Dock Co., general contractor.

WASHINGTON, 500 tons, American Red Cross building, bids to Feb. 7.

UTICA, N. Y., 100 tons, addition to May Co. store.

PHILADELPHIA, 1000 tons, building for Baldwin Locomotive Works.

NEW YORK, 200 tons, Veterans' Hospital, Bronx, to Bethlehem Steel Co.

PHILADELPHIA, PA., 1000 tons, building for U. S. Rubber Co., to Truscon Steel Co.

NEW YORK, 800 tons, Riverside Drive apartment, to Bethlehem Steel Co.

NEW YORK, 300 tons, Lexington Avenue building, to Concrete Steel Co.

WASHINGTON, 400 tons, warehouse for U. S. Rubber Co., to Capital Fireproofing Co.

NEW YORK, 800 tons, International House, Riverside Drive, to Joseph T. Ryerson & Son, Inc.

NEW YORK, 2000 tons, Metropolitan Museum addition, between Lexington Avenue and Fifth Avenue, to Kalman Steel Co.

BOSTON, MASS., Post Office, 500 tons, State Guard Armory, to Hedley-Peirce Co.

NEW YORK, 200 tons, warehouse, Sands and Water Streets, to W. S. Arrowsmith Co.

NEW YORK, 150 tons, school on Nagle Street, to Truscon Steel Co.

BRONX, N. Y., 100 tons, milk plant, to W. S. Arrowsmith Co.

Fabricated Structural Steel

New Projects of 58,000 Tons Include 45,000-Ton Chicago Post Office—Awards Only 7500 Tons

NEW fabricated structural steel projects have reached another substantial total at 58,000 tons, compared with 46,000 tons a week ago and 29,000 tons two weeks ago, but the greater part of this week's total is in a single project, the Chicago Post Office, requiring 45,000 tons. Among other inquiries are an office building in Washington for the Standard Oil Co. of New Jersey, calling for 1500 tons, and highway bridges in the State of New York, 1600 tons.

Awards of 7500 tons are the smallest in many months and compare with 17,000 tons a week ago and 59,000 tons two weeks ago. The only sizable awards reported are an addition to a department store in Cleveland, 1500 tons, and 2000 tons of transmission towers for the Southern Sierras Power Co., Riverside, Cal. Awards follow:

North Atlantic States

NEW ROCHELLE, N. Y., 250 tons, building for College of New Rochelle, to local fabricators.

NEW YORK, 14,000 tons, section 3 of West Side Highway, to Fort Pitt Bridge Works Co. (Tentative award of this project published in THE IRON AGE of Dec. 11.)

NEW YORK, 625 tons, apartment building at 29 West Nineteth Street, to Deere Iron Works.

NEW YORK, 200 tons, garage on East Eighty-seventh Street, to Easton Structural Steel Co.

NEW YORK CENTRAL RAILROAD, 250 tons, bridges; 150 tons to Bethlehem Steel Co., 100 tons to Phoenix Iron Works.

JENKINTOWN, PA., 720 tons, building for Strawbridge & Clothier, to McClintic-Marshall Co.

INDIANA COUNTY, PA., 300 tons, State highway bridge, to Fort Pitt Bridge Works Co.

The South

BIRMINGHAM, 150 tons, municipal airport, to Virginia Bridge & Iron Co.

MARKSHEAD, LA., 500 tons, bridge across Red River, to Stupp Brothers Bridge & Iron Co., St. Louis.

Central States

CLEVELAND, 1500 tons, addition to May Co. department store, to American Bridge Co.

MIDDLETOWN, OHIO, 375 tons, building for Raymond Paper Bag Co., to American Bridge Co.

INDIANA HARBOR, IND., 350 tons, stove shells for Inland Steel Co., to Grover Corp.

Western States

BREMERTON, WASH., 210 tons, warehouse for Puget Sound Navy Yard, to Star Iron Works.

RIVERSIDE, CAL., 2000 tons, towers for Southern Sierras Power Co., 1000 tons to Consolidated Steel Corp., 1000 tons to Internal Derrick Co.

STRUCTURAL PROJECTS PENDING

Inquiries for fabricated steel work include the following:

North Atlantic States

NEWBURGH, N. Y., 200 tons, theater.

NEW YORK, 1500 tons, Lincoln Hospital addition.

NEW YORK, 2000 tons, Samuel Gompers high school in the Bronx; previously reported as 600 tons.

PENNSGROVE, N. J., 300 tons, bridge to Chesterton, Del.; former bids rejected.

STATE OF NEW YORK, 1600 tons, highway bridges.

ERIE, PA., 400 tons, Post Office.

WASHINGTON, 1500 tons, office building for Standard Oil Co. of New Jersey.

PERRY POINT, MD., unstated tonnage, convalescents' building for United States Veterans Hospital.

PENNSYLVANIA RAILROAD, 944 tons, consisting of bridges at Palmyra, N. J., 295 tons; New Brunswick, N. J., 210 tons; Philadelphia, 144 tons, and Schuylkill Haven, Pa., 185 tons, and miscellaneous steel for Sunnyside shops, 110 tons. Low bidders, Bethlehem Steel Co., McClintic-Marshall Co. and Phoenix Bridge Co.

The South

LITTLE ROCK, ARK., 500 tons, Post Office.

Central States

TOLEDO, OHIO, 500 tons, Paramount Publix theater.

CLEVELAND, 100 tons, storage buildings for Standard Oil Co.

AURORA, ILL., 350 tons, plant addition for Barber-Greene Co.

GARY, IND., 900 tons, building for American Sheet & Tin Plate Co.

CHICAGO, 500 tons, additions to Chicago Avenue and Carroll Street stations for Capol Transit Co.

CHICAGO, 45,000 tons, Post Office, Andersson, Probst & White, Chicago, architects.

CHICAGO, 700 tons, Verdic High School, New bids being taken.

ST. LOUIS, 1500 tons, dredges for War Department.

Western States

SANTA ANA, CAL., 154 tons, subway under Southern Pacific Co. tracks; bids Feb. 9.

OAKLAND, CAL., 145 tons, Southern Pacific Co. crossing, Seventh Street; bids opened.

SAN FRANCISCO, 270 tons, two institute buildings for city; McClintic-Marshall Co., low bidder.

SAN FRANCISCO, 100 tons, school on Noe Street; bids opened.

Railroad Equipment

Minneapolis, St. Paul and Sault Ste. Marie is inquiring for 10 to 15 locomotive boosters.

Inland Steel Co. has ordered two six-wheel switching locomotives from American Locomotive Co.

State Railways of Greece are inquiring for 200 mechanical refrigerator cars of 30 metric tons' capacity.

Byllesby Engineering & Management Corp. is in the market for five gondola cars.

February Motor Car Output Expected to Exceed 200,000 Units

DETROIT, Jan. 26.

THERE have been further indications the past week of an acceleration in activities by the automobile industry. Although steel specifications have not been of unusual volume, they have increased sufficiently so that the total tonnage for the month will make a fairly good gain over that of December. Two large automobile makers have ordered castings in generous volume for February delivery, thereby insuring a speeding up of foundry operations. An important pig iron house reports that its January shipments probably will run 30 per cent ahead of December, which was an average month in 1930, and prospects are favorable for another increase next month.

Great Lakes Steel Corpn. has three open-hearth furnaces pouring steel for the first time since its local plant started production last August, and also has put its hot strip mill on a double shift.

These are regarded as signs pointing to expansion of industrial operations. They are bolstered by the Oakland Motor Car Co.'s announcement that January sales will be 50 per cent better than in the same month of 1930, likewise emphasizing that the retail sales situation is better than either the company or its dealers had anticipated. This increase was made with a sales force only 60 per cent as large as a year ago and was confined mostly to the Pontiac line, as the Oakland is just getting into the field. Despite its production of approximately 175,000 cars since it began assemblies of its 1931 models in November, Chevrolet is planning over 70,000 cars for February, and cars in the hands of dealers are about normal. Buick is holding to 500 cars a day four days a week. Packard, Cadillac and Studebaker are understood to be doing fairly well. Chrysler is reported to be scheduling increased work in February, and it is possible that Hudson may step up its program, which recently has been somewhat curtailed. Indications are that Ford's February performance will be 70,000 to 75,000 cars.

February estimates put automobile output at 200,000 cars as a minimum, with likelihood of its reaching a higher mark.

* * *

Paring of production costs and administrative and selling expenses will enable automobile companies to make a better financial showing than in 1930 on same amount of business.

* * *

Automobile plants are more rigid in inspecting materials, with steel sheet makers suffering heavy losses in the form of rejected tonnage as a result.

* * *

January pig iron shipments to automobile industry in Michigan will be 30 per cent higher than in December, which was an average 1930 month.

February Output 200,000 Cars

WHILE it is hazardous to venture a forecast of next month's output, as production is being so closely regulated to current retail demand, it can be said conservatively that it will be at least 200,000 cars. There is a strong likelihood that it will be many thousands over that figure. It looks now as though Ford and Chevrolet together will make 140,000 to 150,000, which leaves only 50,000 to 60,000 for all others to manufacture in order to reach the 200,000 mark.

Detroit's annual motor car show the past week attracted well in excess of 100,000 visitors. Never in the history of the industry has so much car value been offered for so little money. That is the main factor which is relied upon to bring the industry back to normal. Executives are displaying buoyant spirits, and as a group seem to have taken as their slogan the phrase coined by Hudson's president, W. J. McAneeny, "Beyond Depression Lies Prosperity."

Steel Sheets Rejections Large

AUTOMOBILE sheet makers are suffering a greater loss from the large percentage of rejections by customers than from low prices, according to the testimony of an executive high in the councils of a prominent sheet manufacturing company. He states that sheet users in the automobile industry have become much more rigid in their inspection standards in recent months. Sheets with minor blemishes scarcely visible to the trained eye are not accepted today, whereas a short time ago they would have been passed and any flaws touched up, if necessary, in the user's shop.

The reason for this change in policy is that automobile plants have cut their forces to an irreducible minimum, have eliminated operations wherever feasible, and in some cases are not in a position to take a sheet which does not have a perfect finish.

Demand for Alabama Coke Increasing

ALABAMA by-product foundry coke has been moving into this district in large quantities, and its use seems to be increasing. It was only a few years ago that shipments from the Birmingham district into Michigan were almost unheard of but prices have been made so attractive that coke makers at Indianapolis, Terre Haute, Ashland and other northern points now are sharing a generous part of their market with the southern interests. One of the largest automobile foundries has contracted for Southern foundry coke exclusively, and several Detroit foundries allied with the automobile trade also rely entirely on it. Moreover, there is a fairly good demand for it in southern Canada, where numerous foundries are taking a considerable tonnage. Southern pig iron, on the other hand, has not made much progress in the Detroit area, despite its low price in recent months. It is said that it is being used by one Detroit stove foundry, but otherwise buyers are adhering to their long-established sources of supply.

Financial Statements Interest Detroit

NOW that fourth quarter financial statements are appearing, Detroit is interested in the relative showing of automobile makers. Although its earnings are not made public, there is little doubt that profits of the Ford Motor Co. were the largest in the industry. General Motors is expected to reveal profits in excess of common stock dividend requirements of $3. Packard's net earnings were nine million dollars, equivalent to 60c. a share. This is not equal to 1930 dividends, which were not reduced from $1 to 60c. until late in the year. Hud-

son's profits were lean as a result of substantial losses in the last half, while Reo closed the year "in the red." Graham-Paige lost well over two million dollars and Marmon close to two millions. Auburn's statement shows profits equal to $5.43 a share, against $19.20 in 1929.

With the industry facing either actual losses or greatly curtailed profits, it is little wonder that drastic action has been taken toward reductions in production costs and in administrative and selling expenses. Men close to the industry are authority for the statement that these companies are now prepared to make a much better financial showing the coming year on the amount of business done in 1930. This is said to be especially true of General Motors, which has pared costs by consolidating departments, standardizing parts, and resorting to many measures contributing to lower production expenses.

Auburn Motor Car Co. is being commended by many for its decision to announce publicly the placing of contracts for eight million dollars worth of materials in the first half of 1931. It listed the names of companies which were awarded the business. It is believed that if more companies did this as a regular practice it would go far to dispel the atmosphere of gloom which has been hanging over the industrial world. It would give definite evidence that buying is not at a standstill.

Concrete Reinforcing Steel Institute will hold its seventh annual meeting on March 16-18 at the Edgewater Golf Hotel, Biloxi, Miss.

Ryerson Buys Part of Kempsmith Tool Line

Joseph T. Ryerson & Son, Inc., with main offices at Chicago, has acquired the lines of Maximillers, production millers and automatic indexing machines heretofore produced by Kempsmith Mfg. Co., Milwaukee. The transfer involves an outright purchase of good will, patents, patterns, inventory and other assets pertaining to these lines. The cone drive milling machines produced by the Kempsmith company are not involved in the transaction.

A. G. Bryant, general manager of the machinery division of the Ryerson company, states that his company will act as general distributer of the line, direct the sales policy and furnish, through a special engineering staff, including Walter Mickelson, formerly associated with Kempsmith, the necessary services in the promotion of these machine tools.

The acquisition of the milling machine line rounds out the group of machine tools which the Ryerson machinery division is handling as general distributer under a policy recently inaugurated. Ohio shapers and planers, Dreses radial drills, Monotrol and Tritrol lathes and Ohio floor-type and table-type horizontal boring mills are now supplemented by the Maximillers and production millers. Under the plan, Ryerson acts as the sales department for the manufacturers of these products. Sales policy and direction, sales engineering, advertising, etc., are all handled for the factories by the Ryerson company. Ryerson sells these products direct to the trade through its own salesmen and offices in certain localities and in others operates through exclusive local dealers.

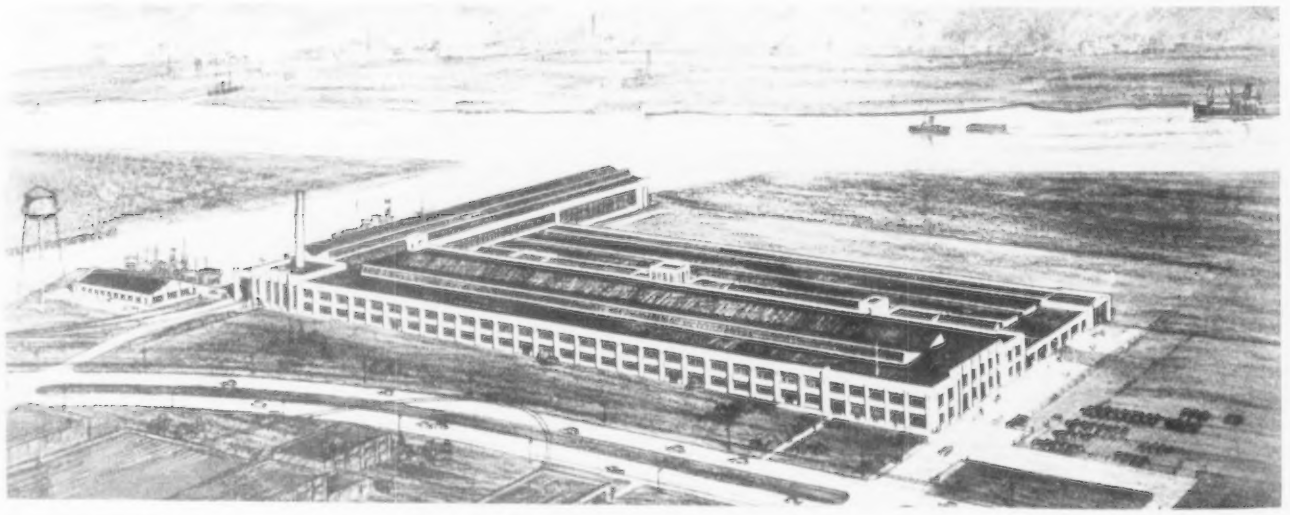
The Sidney Machine Tool Co., Sidney, Ohio, manufacturer of engine lathes, will take over for Ryerson full manufacturing responsibilities in the building of the former Kempsmith products. A. C. Getz, general manager of Sidney, announces that, effective immediately, the company will discontinue the building of its older type of engine lathes and will confine its efforts exclusively to the production of the milling machine line and the Monotrol and Tritrol types of lathes. A number of men formerly identified with Kempsmith as part of its engineering and production personnel will be employed at Sidney in the manufacture of milling machines. The former factory manager of Kempsmith, H. L. Livesay, has been placed in full charge of the production of milling machines at Sidney, Ohio.

Rapid Rise in Number of Domestic Oil Heaters

Production of oil burners for domestic use is reported by the Oil Heating Institute to have progressed so rapidly that the number of homes so equipped has increased from 12,500 in 1920 to 654,000 at the end of 1930. This increase was 5132 per cent.

The institute compares this ratio of increase with that for passenger automobiles, the number of which is reported by the National Automobile Chamber of Commerce to have increased from 14,800 cars registered in 1901 to 619,500 in 1911, or 4086 per cent. Both periods represent the first commercial decades in the respective industries, and the figures are in fairly close concurrence.

FORD MOTOR CO. TO BUILD LARGE PLANT AT SEATTLE



One of the most interesting developments of the Ford Motor Co. in the past year, THE IRON AGE said in a recent issue, has been the $60,000,000 program for the relocation of assembly plants and the building of new ones. A prime consideration in selecting new plant sites is accessibility to both rail and water transportation. Construction of a new Ford assembly plant at Seattle will be started soon. An architect's drawing of the plant is shown. The new plant will have capacity of 300 cars and trucks a day, compared with 115 in the present Ford plant in Seattle.

▲▲▲ PERSONALS ▲▲▲

J. Roy Tanner, since 1911 vice-president and general manager of the Pittsburgh Valve, Foundry & Construction Co., Pittsburgh, has been elected president of that company, succeeding C. A. Anderson, Jr., who has severed his connection with the organization. Mr. Tanner is a well known figure in the valve, piping and foundry industries, having entered the employ of the Pittsburgh company in 1901 following attendance at the University of Pittsburgh. He served as chief engineer until 1911, when he became vice-president and general manager. Mr. Tanner is a member of the American Society of Mechanical Engineers and the Engineers Society of Western Pennsylvania. George J. Stuart has been appointed vice-president and a director of the same company. He is a graduate of Pennsylvania State College, and became identified with the Pittsburgh company in 1901. He served for a time as draftsman and later as assistant chief engineer, succeeding Mr. Tanner as chief engineer in 1911. Four years ago he was made manager of production. Mr. Stuart is a member of the American Society of Mechanical Engineers, the American Society for Testing Materials and the Engineers Society of Western Pennsylvania.

—

Milton Lewis Hersey has been elected president of the Canadian Tube & Steel Products, Ltd., Montreal, to succeed the late James L. Waldie. Mr. Hersey is president also of the Milton Hersey Co., industrial and consulting chemist and engineer; chief chemist, Canadian Pacific Railway Co., and engineer of tests, Canadian National Railways. Charles M. Thomson, identified with the Canadian Tube company since 1918 and general superintendent since 1922, has been made vice-president in charge of manufacturing. A. H. Hough is vice-president and general sales manager and P. B. Nash, secretary-treasurer.

—

Robert Lee Wilson, assistant to the president of the Westinghouse Electric & Mfg. Co., East Pittsburgh, has retired from the company following 37 years of active service. He was born at Shelbyville, Ill., in 1871, and attended the University of Iowa and Rose Polytechnic Institute, Terre Haute, Ind., having been graduated from the latter institution in 1892. Following a year of post-graduate electrical engineering work at Johns Hopkins University, Baltimore, he went with the Westinghouse company in 1894. During his period of service with the company, he served as draftsman's apprentice, inspector, road engineer, district engineer, superintendent of construction, superintendent of railroad construction, assistant general superintendent, works manager, and finally as assistant to the president. While he was serving as district engineer at New York from 1903 until 1905, Mr. Wilson superintended the original electrification of the Manhattan Elevated Railroad and the New York subway. As superintendent of railway construction from 1906 until 1909, he had charge of the electrification work of the New York, New Haven & Hartford Railroad, and also of the St. Clair tunnel of the Grand Trunk railroad. He will be retained by the Westinghouse company on call in a consulting capacity.

—

Walter B. Higgins has resigned as vice-president in charge of sales for the Wheeling Steel Corpn., Wheeling, W. Va. He has been associated with the Wheeling corporation and its predecessors for about 30 years, and has held his recent position for about four years. He was assistant manager of sales for La Belle Iron Works, Steubenville, Ohio, when that company became a part of the Wheeling Steel Corpn., and continued in a similar capacity for the combined companies. In 1923 he became division manager of sales, and later general manager of sales.

John Reed, who has been identified for the last year with the Tiffin, Ohio, plant of the Standard Sanitary Mfg. Co., Pittsburgh, has been appointed superintendent, succeeding George Swinnerton, who has been made assistant manager of the company's Trenton, N. J., plant.

—

Arthur H. Deute, vice-president and general manager of Billings & Spencer Co., Hartford, Conn., has resigned and will become a member of the firm and an executive of Hamman-Lesan Co., Los Angeles, about March 1.

—

A. C. Dunthorne, of the Wheesoe Foundry & Engineering Co., Ltd., Darlington, England, well known British engineer, is spending a few weeks in Cleveland consulting with officials and engineers of Arthur G. McKee & Co. The Wheesoe company recently became exclusive manufacturing agent in Great Britain for the manufacture of McKee oil refinery and blast furnace equipment.

A. S. Duncan has been appointed manager of shipping stocks for the

Roy J. Tanner

George J. Stuart

Milton L. Hersey

Robert L. Wilson

Westinghouse Electric & Mfg. Co., East Pittsburgh. He has been with the company since 1893 and has recently been assistant director of finished stocks. In his new capacity he will have full charge of operations of all stock control units at all works of the company. H. C. McElhone, who has recently been supervisor of ledgers and methods for the Westinghouse company, has been assigned to new duties in connection with analytical reviews of office operations and order procedure.

L. Kattenburg, president, Handelmy. R. S. Stokvis & Zonen, Rotterdam, Holland, arrived on the Bremen in New York, Jan. 20, for a visit of a week to 10 days.

Thomas W. Pangborn, president, Pangborn Corpn., Hagerstown, Md., has been elected to the board of directors of the Equitable Trust Co., Baltimore.

Samuel Wyres has been appointed general superintendent of the Brainard Steel Corpn., Warren, Ohio. He has been connected with that company for some time.

Walter C. Griffith, assistant superintendent, has been named general superintendent of the McDonald bar mills of the Carnegie Steel Co., at McDonald, Ohio, succeeding C. W. Meyers, resigned. Mr. Griffith is the son of Asa W. Griffith, who died recently, and who served the Carnegie company for many years as assistant general superintendent in the Youngstown district. The son has been assistant superintendent of the McDonald plant since Oct. 1, 1926, and for seven years prior to that time served the company as efficiency engineer in the Youngstown area.

Carl W. Meyers has resigned, effective Feb. 1, as general superintendent of the McDonald bar mill plant at McDonald, Ohio, of the Carnegie Steel Co., to become superintendent of bar mills at the Chicago plant of the Republic Steel Corpn. He assisted in the construction of the initial units of the McDonald works 13 years ago, and for six years served as assistant superintendent, before being promoted to general superintendent.

Edwin A. Jones, treasurer and general manager of the Globe Iron Co., Jackson, Ohio, was elected vice-president at a recent directors' meeting, succeeding the late Moses Morgan. He will continue his other duties. John E. Jones was reelected president of the company, and Charles P. Chapman, secretary.

Dr. C. M. Johnson, chief chemist, Park Works, Crucible Steel Co. of America, Pittsburgh, will address the New Jersey chapter of the American Society for Steel Treating on Feb. 3, at the Berwick Hotel, Newark. His subject will be "Stainless and Heat-Resisting Steels."

OBITUARY

Charles Dickey Dyer, for more than 30 years an outstanding figure in the merchant pig iron business in the Pittsburgh and Valley districts, died at his home in Ben Avon, Pa., on Jan. 22, aged 72 years. Prior to his retirement on Dec. 31, 1927, as vice-president and a director of the Shenango Furnace Co., Pittsburgh, he was identified for 25 years with that company, and was also active in the iron ore and Lake transportation industries. During the last three years he had devoted himself to private interests, among them being the Natrona Sand Co., of which he was treasurer at the time of his death.

C. D. Dyer

A. E. Howell

Mr. Dyer was serving as general freight agent for the Crucible Steel Co. of America in 1904 when he was appointed manager of the old Clairton Steel Co. by its receivers. The company was later taken over by the Carnegie Steel Co. Subsequently he became associated with the late William P. Snyder as assistant president of the old Shenango Furnace Co., and when the present corporation was formed in 1906 he was appointed vice-president and a director. He was also made secretary and a director of the Shenango Steamship Co., and along with those duties he served as a member of the executive committee of the Lake Carriers' Association and the Great Lakes Towing Co. During the war Mr. Dyer was president of the American Pig Iron Association for two years, and at that time also served as Pittsburgh representative of the sub-committee of the American Iron and Steel Institute on pig iron, iron ore and lake transportation, working in conjunction with the War Industries Board.

Alfred E. Howell, who retired Oct. 1 as general manager of the Somerville Stove Works, Somerville, N. J., died suddenly of a heart attack at his old home in Nashville, Tenn., on Jan. 25. He was born 71 years ago at Nashville and was graduated from Vanderbilt University in 1882. He was president of the American Foundrymen's Association in 1914 and retired as a director of the association in 1926 after 19 years of service to the association either as a director or an officer. He was superintendent for about 30 years of the Phillips & Buttorff Mfg. Co., Nashville.

Charles Franklin Olin, for 26 years advertising manager of the New Departure Mfg. Co., Bristol, Conn., died at his home in that city on Dec. 25, aged 60 years. At the age of 14 he started on his career in journalism and publicity. Favorable notice attracted by his work brought about his association with the New Departure company.

Harry Darlington, Jr., a director of the Follansbee Brothers Co., Pittsburgh Steel Foundry Corpn. and of the Pittsburgh Forge & Iron Co., Pittsburgh, died of pneumonia at the Allegheny General Hospital, Pittsburgh, on Jan. 25, aged 43 years.

Walter Platt Hatch, formerly president of the Chicago Drop Forge & Foundry Co., died in the Homeopathic Hospital, East Orange, N. J., on Jan. 20, aged 78 years. He held many patents for his inventions, notably in connection with typewriters.

Frederick B. Farnsworth, formerly president of the Eastern Machinery Co., New Haven, died on Dec. 24, aged 79 years. He became identified with the metal-working industries when he went to work for a man who had taken over a bankrupt foundry business. In 1883, Mr. Farnsworth organized the McLagon Foundry Co., and 12 years later he founded the Eastern Machinery Co.

Southern Foundrymen Meet

Two-Day Session at Birmingham Includes Technical Sessions and Plant Visits

THE Southern members of the American Foundrymen's Association held a regional meeting in Birmingham on Jan. 20 and 21. Many Northern States were represented in the large assembly of delegates and visitors at the two-day session. A private car from Detroit brought representatives of the Detroit Foundrymen's Association, including S. W. Utley, former president of the A. F. A. and now president of the National Founders' Association, and A. E. McClintock, commissioner of the N. F. A. C. E. Hoyt, secretary of the A. F. A., and a number of other foundrymen from the North also attended the meeting.

A group of visitors was taken in charge by officers of the Alabama By-Products Corpn., and spent the morning visiting the by-product coke plant of this company. Another group visited some of the local foundries. At noon the corporation gave a luncheon to the visitors at the Mountain Brook Country Club. In the afternoon the party took in some of the sights of the city and in the evening a considerable number of the visitors were the guests of the Hammond Iron Co. at the Birmingham Country Club.

Headquarters of the meeting were at the Tutwiler Hotel. By Tuesday morning about 300 were registered, including representatives from as far east as Connecticut and from many foundries throughout the Mississippi Valley and Northern States.

Several Technical Sessions

The technical sessions were held at the Southern Club. The morning session was under the direction of Dr. J. T. MacKenzie, chief chemist, American Cast Iron Pipe Co. The first matter to be considered was a discussion of the A. F. A. committee's recommendations for the operation of a 54-in. cupola. The recommendations were read and discussed at considerable length.

The next paper was "High-Test Cast Iron" by H. Bornstein, of Deere & Co., Moline, Ill. The author showed a number of lantern slides giving the microstructure of various types of high-test cast iron and discussed the making of these products in the cupola or the electric furnace, by duplexing and also by such processes as that employed in the manufacture of Meehanite.

A considerable number of the members took part in this discussion and it was brought out that high-grade cast iron is not necessarily confined to those having such special equipment as electric furnaces, but that superior material may be obtained by careful cupola practice, the use of steel, alloys, etc.

Attention was called to the fact that the old American Society for Testing Materials standards for high-test cast iron called for materials which would now be relatively low grade and that modern high-test cast iron ranged from 40,000 to 70,000 lb. per sq. in. in tensile strength.

There were two afternoon sessions. In one room Chairman E. K. Smith of the Stockham Pipe & Fittings Co. presided over a meeting devoted to sand control, at which time Mr. Valtier of the H. W. Dietert Co., Detroit, presented a paper from Mr. Dietert. Max Kuniansky of the Lynchburg Foundry Co., Lynchburg, Va., presented a paper on sand control in the pipe foundry. The reading of the papers was followed by discussion and an exhibition of a large number of sand samples and also of the sand control apparatus.

A parallel session was held on foundry costs. L. N. Shannon, Stockham Pipe & Fittings Co., was chairman. This meeting took the form of a round-table discussion of foundry costs. Mr. Jemison, president of the Cast Iron Foundry Research Group, was present to tell of the work of that organization and others presented their experience and all discussed freely the subject of foundry costs.

Banquet Tendered the Visitors

At 6.30 p. m. the foundrymen of Birmingham tendered their visitors an enjoyable banquet at the Tutwiler Hotel. W. D. Moore, president of American Cast Iron Pipe Co. and general chairman of committees, was in charge. Hugh Morrow of the Sloss-Sheffield Steel & Iron Co., was toastmaster. The speaker of the evening was S. W. Utley, former president of the A. F. A.

Plant Visitation Comprehensive

On the second day there was carried out a program of plant visitation. About 30 plants in the district were open to visitors and, by means of a special circular, the visitors were given the opportunity to indicate the plants they would like to see. Where possible, arrangement was made to group the plants in such a way as to take parties of considerable size to a succession of plants. The committee, however, arranged a large number of private cars so that anyone having a special list of plants he wished to visit was given individual attention.

At one o'clock all the parties, so far as possible, were brought together at one of three plants for lunch. At the plant of the American Cast Iron Pipe Co. they were given a typical Southern dinner of roast turkey and ham, with the appropriate accompaniments. At the offices of the Alabama By-Products Corpn. and the Tennessee Coal, Iron and Railroad Co., delightful lunches were served. W. D. Moore, president of American Cast Iron Pipe Co., gave a short address outlining the policies of his company, setting forth the way in which its employees are taken care of.

New Features for May Meeting of Foundrymen

Additional exhibit space, provision for several new sessions, a broader program of papers, excellent meeting room facilities and all convention activities housed under one roof—these are the features of the 1931 convention of the American Foundrymen's Association, to be held May 4 to 7 in Chicago, which promise a highly successful annual foundrymen's week.

Fifty per cent more exhibit space has been provided this year than was available at the 1929 Chicago meeting. Both the exhibition hall and the grand ballroom of the Stevens Hotel, where the convention will be held, are under contract for exhibition purposes.

Preliminary plans for the program of the convention have been well worked out. Some new features have been added and papers have been promised on particularly interesting new developments in foundry practice.

One new feature will be the session on problems relating to pattern making. Increasing attention being given pattern production and procedure by foundrymen led to the initiation of this session.

Another innovation will be the shop operation course on sand control. This phase will consist of a three-period instructional course for those who seek information on how to install a sand control department.

Another new shop operation course will be held this year, dealing with malleable foundry practice. These courses, numbering five this year, will all be arranged to give instruction in the fundamentals of gray iron, steel, non-ferrous and malleable founding, and in sand control.

Round-table luncheon meetings also have been scheduled for the malleable, steel and non-ferrous groups. The steel castings conference will be presided over by H. P. Evans, metallurgist of Hubbard Steel Foundry division of Continental Roll & Steel Foundry Co., East Chicago, Ind. Chairman for the non-ferrous group will be H. F. Seifert, superintendent of brass foundry, Westinghouse Electric & Mfg. Co. of East Pittsburgh, Pa.

Two cost sessions will be held, one on general foundry costs to discuss methods of figuring molding costs and data which the purchaser should furnish when requesting bids. The second cost session will be devoted entirely to non-ferrous foundry costs.

Ore Movement Low in 1930

Total from Lake Superior District by Rail and Water Smallest Since 1924

IRON ore shipments from the Lake Superior district in 1930 were 47,187,661 gross tons, according to the annual report of the Lake Superior Iron Ore Association. There were 46,585,196 tons sent to upper Lake ports for water shipment, and the all-rail movement amounted to 602,465 tons, compared with 961,761 tons shipped all-rail during 1929. Total shipments by water and rail in 1929 were 66,157,359 tons. Shipments were less last year than in any year since 1924, when the total movement was 43,895,110 tons. All-rail shipments were less than in any year since 1921. Shipments by ranges for 1929 and 1930 are shown in the accompanying table.

Shipments from the Mesabi district last year were 65 per cent of the total, of the same percentage as during the previous year. The Gogebic range retained second place, which it has held for a long time, except in 1928, when it was passed by the Marquette and Menominee ranges. The Marquette range was in third place last year, passing the Menominee range, which dropped from third to fourth position in tonnage shipped. The Cuyuna and Vermilion ranges retained the fifth and sixth positions respectively.

Ore was shipped last year from 160 mines, compared with 171 during the previous year. Shipments were made from 72 Mesabi district mines, compared with 81 during the previous year. Ore was shipped from 29 mines in the Menominee district, a loss of one for the year. Marquette district shipments were from 19 mines, a decline of two. There were shipments from 18 Gogebic mines, also a loss of two for the year. From the Cuyuna range, ore was shipped from 17 mines, an increase of three. Five mines in the Vermilion district made shipments, the same as during the previous year.

The Mesabi Mountain mine retained first position in the amount of ore shipped last year, with a total of 2,343,016 tons, although this was less than half the amount shipped by the same mine in 1929. The Hull Rust mine came second with shipments of 2,642,694 tons, or slightly more than during the preceding year. The Sellers mine occupied third position with shipments of 2,291,131 tons. These three mines in the Mesabi district are operated by the Oliver Ore Mining Co., a subsidiary of the United States Steel Corpn.

Four new mines, all in the Mesabi district, were placed in operation during the year. These are the Mahoning-Rust mine, operated by the Oliver Ore Mining Co.; the Ann and the Halobe mines, operated by Butler Brothers, and the Drew mine, operated by the Dohm Mining Co.

Ore beneficiated last year was 18,356,433 tons, compared with 22,939,761 tons during the previous year. Despite the decline in shipments, the amount concentrated declined only slightly last year, having been 6,318,593 tons, against 6,523,8[illegible] tons in 1929. While there was a sharp decline in the amount of ore subjected to drying, that sintered showed a gain, the amount sintered having been 320,939 tons, against 224,063 tons the previous year. Figures showing ore beneficiated by various methods appear in the table.

SHIPMENTS OF LAKE SUPERIOR IRON ORE BY RANGES
(Gross Tons)

Range	To Upper Lake Ports, 1930	All-Rail, 1930	Total, 1930	Total, 1929
Mesabi	30,725,744	341,548	31,067,292	43,008,229
Gogebic	5,061,475	2,256	5,063,631	7,624,085
Menominee	3,607,841	1,211	3,609,052	5,645,395
Marquette	3,451,502	182,266	3,633,968	5,409,712
Cuyuna	1,898,125	31,064	1,929,189	2,596,186
Vermilion	1,840,109	41,120	1,881,529	1,873,712
Mayville	none	none	none	none
Total U. S. Mines	46,585,196*	602,465	47,187,661**	66,157,359

*Includes 2223 tons left on docks.
**Includes 509 tons lost in transit.

BENEFICIATED IRON ORE, 1930
(Gross Tons)

Method	Minnesota	Michigan and Wisconsin	Total
Washing	4,947,841		4,947,841
Jigging	923,810		923,810
Drying	126,003		126,003
Sintering	320,939		320,939
Total concentrating	6,318,593		6,318,593
Crushing and screening	7,572,876	4,464,964	12,037,840
Total beneficiated	13,891,469	4,464,964	18,356,433

(a) Improves physical structure only.

Census Estimates 3,354,870 Motor Cars Built in 1930

WASHINGTON, Jan. 26.—Production of motor vehicles in the United States in December made an increase of 19,849 units over that of November, rising to 155,601 from 135,752, according to the Bureau of the Census. The output of passenger cars in December increased 20,277 to 122,645 from 102,358, while the truck output declined 1254 to 31,531 from 32,785. The production of taxicabs in December was 1425, against 609 in November.

For the year 1930, the United States production of motor vehicles totaled 3,354,870, a drop of 2,003,550 from the 1929 output of 5,358,420. The 1930 production of passenger cars was 2,805,413, a decrease of 1,764,398 from the 1929 production of 4,569,811. Motor trucks to the number of 540,521 were manufactured in 1930, a drop of 230,499 from the 1929 production of 771,020. The taxicab production last year was 8936, against 17,598 in the previous year.

The Canadian production of motor vehicles last year was 154,192, a decrease of 109,103 from the output of 263,295 in 1929. Of the 1930 Canada production, 125,442 units were passenger cars, representing a decline of 82,056 from the 1929 production of 207,498. The truck production in Canada last year was 28,750, a drop of 37,047 from the output of 55,797 in 1929.

Malleable Castings Output 43.6 Per Cent in 1930

WASHINGTON, Jan. 26.—Orders for malleable castings in December totaled 26,429 tons, against 27,451 tons in November, according to reports received by the Bureau of the Census from 116 establishments operating 130 plants. Production in December was 30,371 tons, representing 31.1 per cent of capacity, against 27,114 tons in November, or 27.8 per cent of capacity. Shipments were 27,353 tons and 25,974 tons respectively.

Total orders in 1930 were 475,821 tons, compared with 785,878 tons in 1929, while the production was 514,943 tons, or 43.6 per cent of capacity, compared with 824,856 tons, or 71.3 per cent of capacity. Shipments in 1930 were 519,680 tons, compared with 818,150 tons in 1929.

Machine Exists for Man—He Can and Does Control It

By MYRON C. TAYLOR

▲ ▲ ▲

IN 1929, when serious declines occurred in the values of the securities of the country, it appeared to us that these declines were forerunners of eventual readjustment of commodity values, that as a possible consequence of such unsettlement, evidencing overproduction, the operations of our plants, like others similarly situated, might be interfered with, and that, unless provision against it were made, unemployment would inevitably follow.

Plans were promptly made and a really simple expedient employed that if operations should be substantially lessened, the remaining work would be distributed equitably, as nearly as might be, among all the workers, giving to each a ratable portion of such work as was going; this program to be continued as well as could be done throughout such emergency.

Employment Maintained

For the period Jan. 1 to July 1, 1930, the number employed, either on whole or on part time work, was equivalent to an average of 221,123 employed for the entire period, as against an average for the year 1929 of 224,980.

For the month of December, the last period for which we have complete reports, there were employed on either full or part time in the various corporation activities 226,614 men. This in a period when operation of the plants was on the basis of only 38 per cent.

Attention is called to the fact that upward of 12,000 men have been given employment on construction work, in the advancement of which we have consistently carried out our construction program without change as outlined at President Hoover's Conference in Washington on Nov. 21, 1929.

Methods of Giving Relief

The record of assistance rendered to employees and their families has been classified under three heads:

Direct relief given by the corporation;

Credits extended by the corporation;

Relief extended by good fellowship clubs and other employees' welfare organizations.

For the period between Oct. 1 and Dec. 31, 1930, our reports show under these three headings that total expenditures for relief had amounted to $210,782.

Other ways in which relief is constantly being extended are through the regularly organized company hospitals, the company medical staffs and visiting nurse organizations, and groups of employees organized at some of the plants.

We are confident that, when the final chapter of this depression is written, the United States Steel Corpn.'s record in providing work and in extending relief to its employees will be one of its outstanding achievements.

IN an address over a nation-wide radio hook-up Tuesday evening, Jan. 27, Myron C. Taylor, chairman, finance committee, United States Steel Corpn., declared that the machine age is man's greatest achievement. To supplant it with something of unknown quality would bring disaster upon those who most need relief and protection. The challenge of the time is to so organize and systematize the use of the machine that the individual will be insured greater opportunities, lighter burdens and a fuller life. How intelligent planning can so distribute work as to prevent unemployment, even in a severe depression, is shown by the remarkable record of the United States Steel Corpn. in 1930, as outlined by Mr. Taylor.

▼ ▼ ▼

Machine Has Lifted Burdens of Ages

I have been asked also to say a word upon the general subject of the effect of mechanical production of primary commodities, as contrasted with the earlier basis of muscle and human energy upon which civilization rested.

The present age is different. We have machines with vast and tireless resources; and we have today developed and perfected an accelerated dynamic civilization in which the acceleration comes from power.

In the first flush of the great resulting changes, and the application of power to mechanical rather than human means of production, we lose our perspective. In the face of an increased production we turn our thoughts mainly to the machine that made it possible; we overlook the fact that it is MAN who made possible this great production, through the machine; that it is an intriguing and a continuing expression of his effort and his more cultivated intellect that is putting the world forward a distinct and glorious step in lifting from man's shoulders the burdens of the ages.

Our Problem to Systematize Its Use

The machine is of no use without the control and direction of man—and he can and does control it and direct it. Our problem—now that in so many ways we have brought the machine to aid the labor of our nation that all of our primary commodities, either of raw materials or of manufactured articles, are strongly influenced by it—is to organize and systematize its use, and in so doing to benefit mankind, not to injure or destroy mankind. Through these instrumentalities, the quality of mind that is developed to control and direct the mechanics of the age is necessarily of an improving and a higher order. That in itself means progress for the individual, and in that progress there is a cheapening of product, bringing a vast variety of useful and enjoyable commodities within the reach of all, and a corresponding awakening of the intelligence of man which promptly reaches out for these new benefits. Triumphant over the whole field stands, not the machine, but the MAN.

We who are interested in these problems, by cooperation and exchange of thought and idea and plan, can bring about such an ordered system that the individual will find the burdens growing lighter, opportunities becoming greater, and the enjoyment of life by him and his family and those about him expanding and improving in every direction.

If there be any objective in this existence of ours worthy of the time and effort by us who are passing through it, it must be to raise mankind in general not the particular few, but the entire race—to higher levels of understanding and cooperation, of enjoyment and well-being. The crusaders in this cause, those who seek through thoughtful and orderly channels to

contribute to the well-being of the whole, will have attained life's greatest reward, because it can be accomplished through no other way than service, and this sort of service is worthy of the talent and abilities of the greatest minds of the age.

No Time for Radical Doctrines

At the moment we are a bit stunned by the exploitation of great productive innovations. We may have traveled too fast, and for the moment may have saturated the market with all commodities, from the grains to the products of industry. But in the process there has been a general prosperity throughout the land, comparable with no other period in its history, and not equaled by any other nation in history.

The frugal ones in the community have put by sufficient to tide them through a reasonably relaxed period. But there are instances where necessity and lack of proper wisdom have led many to part with their earnings. It is such times that the comparatively few in the community become the concern of the many, and violent doctrines are proclaimed, intemperately, unwisely, by some of the few. It is then that the whole problem comes before our minds for review and analysis. New courses are laid, which, based upon past experience and the best information obtainable under existing circumstances, will help us to avoid a repetition of such situations in the future.

It becomes our duty to deal kindly and generously with that minority in the community who are in real distress, but not to permit destruction of or damage to the great system which man, by patient effort through the thousands of years of history, has created and set up, and which in the general run of life gives now to those who are conscientious, willing and faithful the great privileges at hand in our world of today. To tear down these facilities and supplant them with something of unknown quality which has no particular virtue or experience to recommend it, would be a crime against the Creator and the faculties which He inspired to produce these benefits, and would bring eventual disaster upon the very ones who most need relief and protection.

The machine age is not a cold-blooded and cruel thing which seeks to exterminate man; it is man's finest expression through which great forces have been revealed to him by the Divine Hand, enabling him so to harness these forces and direct their use that they shall be man's servant and not his master.

Work Must Be Divided Equitably

Out of the experience of this year will flow much that is good by way of example and experience and remedy. Until we resume a normal basis of operation it should be the first duty of every individual concerned with the employment of others to see, during this dull period, that the work—whether it be 60 per cent or 70 per cent or 80 per cent or 100 per cent of capacity—is divided equitably among those who are able and willing to work.

In the meantime, to assist those less fortunately placed, our generous people who have enough and to spare can be depended upon to share their loaf with such as may be found to be in real distress. In no other way could the public lend a more helpful hand than in the effort now being made by the Red Cross to raise funds.

Bethlehem Steel Shuts Down Coatesville, Pa., Mill

The Bethlehem Steel Co. has issued the following statement:

"Change of the operating program at the Coatesville, Pa., plant of Bethlehem Steel Co. was announced at the Bethlehem offices today (Jan. 22).

"It has been decided to discontinue the manufacture of plates at Coatesville, thus affecting the open-hearths and plate mills. Such material as can be salvaged in the nature of buildings, machinery equipment and supplies will be transferred to other plants and there used in the rounding out of other facilities.

"Wherever feasible workers who have been employed in plate manufacture will be transferred to other points.

"The tube operations are being continued at Coatesville."

The Bethlehem Steel Co. acquired the Coatesville plant in March, 1923, by purchase of the Midvale Steel & Ordnance Co. It was the former Worth plant. There are two blast furnaces, with total annual capacity of 523,000 tons, 10 open-hearth furnaces, capacity 336,000 tons a year, and three sheared plate mills, rolling up to 140 in. wide, with a total capacity of 216,000 tons of plates a year. The tube mill, which will continue to operate, rolls mostly charcoal iron tubes and has an annual capacity of 24,000 tons.

Building Permits Showed Increase in December

Reports from 293 identical cities, of 25,000 population and more, showed total building permits for construction and alterations in December amounting to $128,910,000, according to the United States Bureau of Labor Statistics. This represents an increase of 8.1 per cent over the $119,203,000 reported for the same cities in November. Substantial decreases were reported from the Middle Atlantic States and the East North Central sections, which were more than offset by increases in New England, West North Central, South Atlantic and Mountain and Pacific divisions.

Residential construction showed a reverse from the general trend, having decreased 11.4 per cent. The December total was $44,757,000, against $50,532,000 in November. Non-residential buildings showed an increase of 18.3 per cent, at $66,253,000, against $56,013,000 in November. The difference in each month between the sum of residential permits and non-residential represents the amount for alterations and repairs.

W. S. Wheeler Elected Head of Steel Plate Institute

The Institute of Steel Plate Construction announces the election of the following officers for the ensuing year: President, W. S. Wheeler, Pennsylvania Engineering Co., New Castle, Pa.; vice-president, Arthur Caverno, Lancaster Iron Works, New York; treasurer, B. P. McDaniels, McClintic-Marshall Co., Pittsburgh; secretary, J. W. Poushey, 33 West Forty-second Street, New York.

The program outlined for the institute includes the following:

Promoting among the members of the organization an intelligent and cordial understanding of the industry's problems.

Technical research to develop new uses and broader markets for steel plates.

Collection and dissemination of information on all matters of interest to the industry at large and about the industry in which the general public is concerned.

Establishment in the industry of uniform and ethical standards of practice, and in trade relations usages that are fair to all parties.

Promotion of uniform standards and specifications especially as relates to construction that affects the general welfare.

Cop-O-Lead, a New Alloy of Copper and Lead

The Whitman Metals Reduction Corpn., Tucson, Ariz., is now located in a reinforced concrete building 90 x 300 ft., having a floor space of approximately 27,000 sq. ft. In this plant the company expects to produce 10,000 lb. of metal products daily, specializing in the manufacture of Cop-O-Lead. This product is claimed to be a true suspension of lead in copper, the copper remaining in its native state as well as the lead.

It is explained that what really takes place is that the gases, formed in the melting of the copper at a high melting point, are replaced by molecules of lead surrounded by copper, which creates the suspension of the lead. This product is one of the so-called freak metals which has long been experimented with. Its usages are numerous. It is pointed out as satisfactory for a cold-running bearing which requires little oil. It has a high melting point and tensile strength, considerable compression and resistance to heat, less the usual friction found in most bearings. It will withstand wear, is reasonable in price, and can be made in any shape desired for any purpose where bearing materials are required.

December Exports Lowest in Years

WASHINGTON, Jan. 27.—Making a decline of 1,152,832 gross tons, or 37.9 per cent, exports of iron and steel products from the United States in 1930 totaled only 1,985,025 tons, against 3,037,857 tons in 1929. Exports in 1930 were the lowest since 1925, when they were 1,762,571 tons.

Imports dropped 215,093 tons, or 28.6 per cent, aggregating 538,089 tons, compared with 753,182 tons. The 1930 imports were the lowest since 1921, when they totaled only 120,578 tons.

Exports in December dropped to 101,988 tons, the lowest for any month in 1930, and 10,980 tons under the November total of 111,968 tons, the previous low mark for the year. The total was the lowest for any month since September, 1921, though closely approached by February, 1925.

Imports in December were 40,754 tons, a decrease of 2341 tons from November.

Decreases were made in every item in the export list in 1930, when compared with 1929. The largest decline was in scrap, which fell 207,191 tons (37 per cent) to 350,499 tons. The next heaviest decline was in plain structural shapes, which fell off 145,732 tons (51 per cent) to 142,781 tons. Other large declines were made in steel bars, which dropped 102,806 tons (56 per cent) to 81,088 tons; plates, which fell 95,355 tons (49 per cent) to 98,340 tons, and galvanized sheets, which showed a decrease of 58,016 tons (39 per cent) to 93,494 tons.

Except for bars and sheets and saw plates, declines were made in all the important items in the import list, also. Imports of bars rose to 48,390 tons from 38,220 tons, and sheets and saw plates made the slight gain of 1376 tons, increasing to 26,594 tons.

Heaviest declines in imports were in scrap, which fell 62,997 tons to 27,482 tons; structural shapes, which dropped 27,905 tons to 120,317 tons; "other pipe," principally seamless tubes, which decreased 19,022 tons to 21,538 tons; ferromanganese, which dropped 14,998 tons to 51,615 tons; and pig iron, which declined 10,024 tons to 137,739 tons.

The greatest loss in exports last year was in those to Canada, the leading outside market for American steel. Making a decline of 414,241 tons, or 33.5 per cent, exports to Canada in 1930 were only 820,620 tons, against 1,234,861 tons in 1929. Japan, the second largest export market, took only 276,626 tons last year, a decrease of 150,348 tons, or 35.2 per cent, from 1929, when shipments to that country aggregated 426,974 tons. The only important gain in export markets last year was in shipments to Chile, which rose to 81,960 tons, an increase of 14,019 tons, or 20.6 per cent over 1929.

Pig iron was the largest item of importation in December. Of the total of 13,881 tons, India supplied 13,591 tons. Of the 28,717 tons of manganese ore imported in December, 9734 tons came from Soviet Russia, 9171 tons from Brazil, 6051 tons from the Gold Coast of Africa, and 3761 tons from India.

Exports of Iron and Steel Products from the United States

(In Gross Tons)

	December		12 Months Ended December	
	1930	1929	1930	1929
Pig iron	474	1,618	13,686	46,357
Ferromanganese	...	83	6,854	1,374
Scrap	10,980	56,473	350,499	557,044
Pig iron, ferroalloys and scrap	*11,454*	*58,174*	*371,043*	*604,975*
Ingots, blooms, billets, sheet bar	319	896	17,032	42,690
Skelp	3,248	1,636	119,884	130,975
Wire rods	3,013	3,056	39,777	42,251
Semi-finished steel	*6,580*	*5,588*	*176,693*	*215,916*
Steel bars	2,932	8,268	81,088	183,894
Alloy steel bars	435	1,377	6,663	15,743
Iron bars	128	221	1,823	5,074
Plates, iron and steel	4,396	11,305	98,340	193,695
Sheets, galvanized steel	4,799	12,078	87,222	151,510
Sheets, galvanized iron	234		6,272	
Sheets, black steel	19,088	9,365	137,871	173,602
Sheets, black iron	714	1,205	11,461	15,855
Hoops, bands, strip steel	1,824	5,207	39,315	70,864
Tin plate; terne plate	8,912	24,522	225,640	258,965
Structural shapes, plain material	9,881	14,841	142,781	288,513
Structural material, fabricated	4,096	5,848	101,092	112,099
Tanks, steel	864	...	20,456	...
Steel rails	2,546	10,034	95,301	116,060
Rail fastenings, switches, frogs, etc.	1,085	2,938	19,515	32,597
Boiler tubes	765	1,918	14,690	19,506
Casing and oil-line pipe	4,160	6,983	62,100	113,584
Pipe, black and galvanized, welded steel	4,418	15,278	79,621	145,186
Pipe, black and galvanized, welded iron	428		14,174	
Plain wire	1,689	3,275	26,480	45,505
Barbed wire and woven wire fencing	1,842	4,397	39,093	64,478
Wire cloth and screening	84	113	1,600	1,667
Wire rope	270	375	4,556	8,958
Wire nails	608	806	8,468	12,987
Other nails and tacks	495	642	5,881	10,256
Horseshoes	5	9	180	441
Bolts, nuts, rivets and washers, except track	693	1,479	10,134	16,235
Rolled and finished steel	*77,391*	*142,484*	*1,341,791*	*2,085,271*
Cast iron pipe and fittings	2,058	3,647	31,587	46,919
Malleable iron screwed fittings	903	1,195	10,921	12,534
Car wheels and axles	1,227	1,177	14,968	21,459
Iron castings	589	697	6,613	10,976
Steel castings	314	503	9,380	10,824
Forgings	586	710	8,467	12,070
Castings and forgings	*5,677*	*7,929*	*81,946*	*114,782*
All other	886	1,163	13,562	16,910
Total	101,988	215,328	1,985,025	3,037,857

Imports of Iron and Steel Products into the United States

(In Gross Tons)

	December		12 Months Ended December	
	1930	1929	1930	1929
Pig iron	13,881	17,172	137,739	147,763
Sponge iron				
Ferromanganese and spiegeleisen*	1,111	1,004	51,615	76,613
Ferrochrome†	...	48	162	645
Ferrosilicon‡	274	452	4,626	9,426
Other ferroalloys	...	...	687	...
Scrap	1,222	1,759	27,482	90,479
Pig iron, ferroalloys and scrap	*16,488*	*23,436*	*223,311*	*325,926*
Steel, ingots, blooms, billets, etc.	1,926	1,705	22,296	26,494
Wire rods	684	1,039	8,842	15,653
Semi-finished steel	*2,610*	*2,744*	*31,138*	*42,147*
Concrete reinforcement bars	2,369			
Hollow bar and drill steel	48	2,805	48,390	38,220
Merchant steel bars	3,812			
Iron bars	203	219	1,551	2,932
Iron slabs				
Boiler and other plate	...	...	1,893	3,243
Sheets, skelp and saw plate	2,082	2,546	26,594	25,218
Tin plate	6	19	260	286
Structural shapes	5,041	8,242	120,317	148,222
Sheet piling				
Rails and rail fastenings	198	199	8,424	6,586
Welded pipe	375	2,020	21,538	40,560
Other pipe	1,502			
Barbed wire	377	544	4,674	5,999
Round iron and steel wire	115	478	4,234	5,825
Telegraph and telephone wire	2	...	49	26
Flat wire and strip steel	41	154	1,098	2,175
Wire rope and strand	186	222	2,592	2,451
Other wire	35	62	370	498
Hoops and bands	1,777	1,562	23,057	42,145
Nails, tacks and staples	479	746	6,013	9,234
Bolts, nuts and rivets	37	74	348	429
Horse and mule shoes	...	...	15	25
Rolled and finished steel	*18,680*	*20,581*	*274,218*	*334,174*
Cast iron pipe and fittings	1,889	975	11,896	50,035
Castings and forgings	87	125	1,526	1,900
Total	40,754	48,261	538,089	753,182
Manganese ore*	28,717	20,365	281,304	308,594
Iron ore	175,926	204,799	2,774,124	2,620,717
Magnesite (dead burned)	3,259	1,458	41,467	44,976

*Manganese content only.
†Chromium content only.
‡Silicon content only.

Railroads Inquire for Machine Tools

Santa Fe and New York, New Haven & Hartford Issue Fair-Sized Lists

TWO railroad inquiries, one from the Santa Fe for 11 machines and the other from the New York, New Haven & Hartford for 13, feature this week's machine tool developments. Other inquiries of more than usual size are from the Hercules Motor Mfg. Co., Canton, Ohio, for a number of lathes, drilling and milling machines, and from the South Milwaukee, Wis., Board of Education for seven machines. The volume of miscellaneous small inquiries is increasing, thereby giving rise to the expectation that the moderate gain in machine tool orders this month will be sustained.

In some districts, notably in the East, the improvement which set in early in the month has continued. While conditions are not uniformly better in all sections, there has been enough spotty betterment to indicate that the aggregate sales of machine tools in January will mark a noticeable upturn from December.

Machine tool plants are still operating on greatly reduced schedules. The increase in business thus far in the new year has been too small to bring about an increase in production. Moreover, many machine tool companies have stocks of completed tools sufficient to take care of incoming business, and it will require considerably more of a gain than has occurred to affect manufacturing schedules to any extent. However, there is more confidence than existed a month ago in the outlook for the near future.

New York

Machine tool dealers are encouraged by the fact that the improvement which set in early in the month was sustained in the past week. Prospects appear good that total sales in January for most of the sellers will exceed those of December by a fairly good margin. Machine tool orders, however, had dropped to such a low point that even the most satisfactory totals for the current month will fall far short of what is considered a normal volume of business. The machine tool trade, in canvassing manufacturing industries, finds that some have experienced an improvement in their business this month, but the change is not uniform, as a good many companies will do scarcely any better in January than they did in December. Orders for machine tools are well scattered as to industries. New England is perhaps more active than New York State and New Jersey.

The New York, New Haven & Hartford Railroad has issued an inquiry for 13 items of shop equipment as follows: One 42-in. boring mill, one No. 2 universal cutter grinder, three engine lathes, two flat-head turret lathes, one combination punch and shear, one two-head milling machine, two high-speed sensitive drilling machines, one tool room lathe and a power brake. The Navy yards along the Atlantic Coast are buying equipment. Orders are expected shortly from the Brooklyn yard for a number of lathes and other tools.

Chicago

Improvement in the machine tool market is still somewhat intangible except from the viewpoint of inquiries, which are more numerous. The Santa Fe has added materially to its requests for prices, and the South Milwaukee Board of Education is asking for bids on a 6-in. x 6-in. hack saw, a 9-in. x 3-ft. 6-in. lathe, an 11-in. x 4-ft. lathe, a 13-in. x 5-ft. lathe, an arbor press, a floor grinder and a bench drill. Visitors to salesrooms also are on the increase, thereby giving the impression that interest is growing and that a more definite upswing in general business will bring about machine tool purchases on a larger scale.

Inquiries recently issued by the Santa Fe:

One 8-in. pipe cutting-off machine.
One 4-in. double-head pipe and nipple threading machine.
Nine emery wheel stands.
One 16-in. x 16-ft. lathe.
One 6-ft. radial drill.
One 20-in. heavy-duty drill.
One 12 x 24-in. grinder.
One 20-in. upright drill.
One 32-in. shaper.
One 3-in. forging and upsetting machine.
One Oster, or equal, pipe-cutting and threading machine.
One Oliver die-making machine.
One Cincinnati Acme No. 5, or equal, universal flat-turret lathe.
One Landis, or equal, 20 x 44 x 96-in. piston rod grinder.
One Davis, or equal, tool grinder.
All machines to be motor driven.

Milwaukee

Recent improvement in the machine tool market is being well sustained and in some instances is calling for enlarged production schedules and an upward trend in working forces. January undoubtedly will go down as one of the best months since last spring. Purchases are being made by a wide variety of industries. The outlook is generally regarded as more favorable than it has been for a long time. Inquiry continues to increase, making prospects for February business brighter. The used tool market is quiet, although light equipment is moving at a moderate rate.

Cincinnati

The small demand for machine tools, combined with the slack season, still keeps district plants operating on reduced schedules. Inquiry continues good. Despite the quietness of the market, manufacturers are optimistic regarding the future.

Cleveland

Recent improvement in inquiry for machine tools has not yet been reflected in any gain in orders, and the past week was very dull. Inquiry was lighter than some of the preceding weeks, and prospective purchasers, as a rule, are holding off. While there has been some gain in operations, metal-working plant managers do not seem to feel that the uptrend is sufficient to warrant the purchase at present of machinery they have had under consideration. The only new inquiry of size that came out during the week was from the Hercules Motor Mfg. Co., Canton, which is in the market for a number of lathes, drilling and milling machines.

Pittsburgh

Machine tool buying in this district has failed to reflect the improvement reported from other parts of the country. Sales by some dealers do not even compare favorably with December.

which is normally a very poor month. Nevertheless, inquiry since the first of the year is encouraging, even though it contains no lists of outstanding importance. Single tools predominate in prospective business, but most of them represent urgent needs on the part of buyers and will likely be closed within the next few weeks.

Makers of steel mill equipment are very optimistic and continue busy. Two large orders, referred to previously, have been placed since the first of the year and negotiations are quietly under way for other important developments. Steel companies are taking advantage of all possible plant economies, and more modernization work is said to be in prospect than at any time since the war.

New England

New tool dealers have booked additional orders ranging in value from $2,000 to $3,000 each, and, while business is far from active, January will be a much better month than December. The used tool market is showing signs of life.

Bullard Machine Co., Bridgeport, Conn., stockholders have received a letter from President E. P. Bullard, from which the following is quoted: "We have, during 1930, suffered with other industries, but not to the extent experienced by others in the machine tool field. We attribute this to the fact that we have specialized in cost-reducing, productive equipment. At present our plant is operating at 67 per cent of normal budget, and shipments during the past three months have averaged 63 per cent of normal budget. During the past month, however, we have averaged 88 per cent of normal shipment budget, and we have orders on our books which will permit us to continue this rate well into the coming quarter. Outstanding quotations are above normal, and the outlook for the continuation of business is favorable."

New York

PLANS are being considered by Peoples Light & Power Corpn., 27 William Street, New York, for a hydroelectric power project on Dan River, North Carolina, where site is being selected, to cost over $5,000,000 with transmission system and distributing facilities. Company engineering department will be in charge.

Department of Correction, Albany, N. Y., is asking bids until Feb. 19 for a new industrial shop, storage and distributing building at Institution for Defective Delinquents, Napanoch, N. Y., to cost over $150,000 with equipment. Plans at office of State Commissioner of Architecture, State Office Building, Albany.

Car Service & Parts Corpn., affiliated with Checker Cab Service, 1775 Broadway, New York, has leased four floors in building at 521-31 West Fifty-seventh Street, extending to West Fifty-eighth Street, and will use in part for a new service and repair works, including parts department.

H. E. Lauman Associates, Inc., New York, has been organized with a capital of $15,000 to take over and expand company of same name with headquarters at 50 Church Street, manufacturer of heating equipment. Herman E. Lauman and John T. Cummins are heads.

Board of Trustees, Hunter College, Navy Avenue and Bedford Park Boulevard, Bronx, New York, has filed plans for a one-story storage and distributing building to cost $125,000 with equipment. Thompson, Holmes & Converse, 101 Park Avenue, New York, are architects.

Navy Purchasing Office, New York, is asking bids until Feb. 3 for arc welding sets, hammers, hatchets, oxygen cylinders, hacksaw blades and other equipment.

Newbury Mfg. Co., Monroe, N. Y., manufacturer of pipe fittings and kindred iron specialties, H. A. Newbury president, has purchased plant and business of J. & H. Foundry Co., Talladega, Ala., specializing in cast iron posts for street-lighting, etc., and will operate as branch works. Foundry facilities will be expanded at acquired plant and portion of work heretofore carried out at Monroe will be transferred to that point.

Columbia Gas & Electric Corpn., 61 Broadway, New York, operating electric light and power properties and natural gas systems in New York, Pennsylvania and other states, has arranged for a bond issue of $50,000,000, part of proceeds to

INDUSTRIAL CONSTRUCTION

Current Projects Decreased During Past Week, But Utility Appropriations Are Larger

THE total of new construction projects for immediate completion as compiled for the past week is smaller than for any previous week in the current year. The total of $8,881,500, which represents money to be spent in current projects involving plant construction and equipment, railroad and municipal improvements, is approximately $18,000,000 under that of the week preceding. This cannot be taken, however, as signifying a trend, since the preceding week displayed a $7,500,000 gain over the one which went before it.

Long term utility projects which will very largely be completed during the present year amounted to $108,000,000. This is an increase of $35,000,000 over the week before.

The summary of current projects for the week is as follows:

Public utilities and power plants	$1,200,000
Industrial plants	4,639,000
Metal-working plants	1,400,500
Railroad improvements	845,000
Municipal improvements	797,000
Total	$8,881,500

In addition to the above, new school construction and equipment announced during the week amounted to $6,205,000 and oil and gas pipe line projects, $3,000,000.

Among the industrial plant projects is an item of $1,500,000 for new buildings and equipment for the production of sulphuric acid and kindred products. The work will be done for the Tennessee Copper & Chemical Co., at Copperhill, Tenn.

General Electric Co., Nela Park, Cleveland, will erect an addition to its wire drawing plant and a powerhouse. The work involves $500,000.

Notable among the week's announcements of utility projects is a $21,000,000 appropriation to be arranged by the Georgia Power Co. of Atlanta for extensions and improvements during the year. Another large project is represented in proposed expansion and improvements by the Buffalo General Electric Co., involving upward of $20,000,000.

be used for extensions and improvements in plant and facilities. Company is carrying out pipe line construction to furnish natural gas at Washington, York, Pa., and other points in that district, and will also carry out expansion program for its subsidiary, Columbia Oil & Gasoline Corpn., in Panhandle district of Texas and Oklahoma.

H. J. Nurick, 44 Court Street, Brooklyn, architect, has plans for a four-story automobile service, repair and garage building on Pitkin Parkway, to cost over $125,000 with equipment.

Samuel Levine, 12 Vernon Avenue, Brooklyn, and associates have organized Seaboard Body Corpn., with capital of $10,000, to operate a local plant for manufacture of automobile bodies. Philip Burnstein, 9 Roberge Place, Brooklyn, is interested in new company.

Texas Corpn., 17 Battery Place, New York, has plans for an oil storage and distributing plant at Port Angeles, Wash., to cost over $90,000 with equipment.

Auerbach Tire Works, Inc., 976 Bushwick Avenue, Brooklyn, is planning to rebuild part of plant recently destroyed by fire, with loss of $40,000 including equipment.

Eagle Iron & Brass Foundry, Market Street, Passaic, N. J., will be consolidated with William P. Laytham & Sons Co., 899 Market Street, Paterson, N. J., manufacturer of iron and other metal castings. Both companies have been affiliated in past, with William P. Laytham as president. Eagle plant will be removed to Paterson, where increased capacity will be carried out. Passaic foundry will be closed.

Public Service Electric & Gas Co., Public Service Terminal, Newark, has authorized a new preferred stock issue to total about $23,341,000, part of proceeds to be used for extensions and improvements. Plans have been filed for a new power substation to cost close to $90,000 with equipment.

Jersey City Ladder Co., Inc., 677 Montgomery Street, Jersey City, N. J., has revised plans for a two-story and basement factory, 45 x 138 ft., to cost about $40,000 with equipment. Barney Singer, 321 Bergen Avenue, is architect.

American Welding & Machine Works, Inc., Newark, has been organized to take over and expand company of same name with local plant at 481 Ogden Street. James H. Bowie and Charles Pashong are principal incorporators of new organization.

Board of Education, Manasquan, N. J., is considering installation of manual training equipment in new three-story high school to cost about $250,000 for which bids will soon be asked on general contract. Coffin & Coffin, 522 Fifth Avenue, New York, are architects.

Board of Education, Newton, N. J., is considering installation of manual training equipment in new junior high school to cost over $250,000. Hacker & Hacker, 201 Main Street, Fort Lee, N. J., are architects.

New England

BIDS have been asked on general contract by City Engineer, City Hall, New Haven, Conn., for field equipment and storage building, administration building and other units, at new municipal airport at Morris Cove. Westcott & Mapes, 129 Orange Street, are engineers.

Standard Oil Co. of New York, 26 Broadway, New York, is planning construction of pipe line from East Providence, R. I., to Springfield, Mass., and vicinity, about 100 miles, for gasoline transmission from tidewater, including pumping stations, storage and distributing plants, etc., to cost over $1,000,000.

Quincy Pump Co., Quincy, Mass., recently organized with capital of $50,000 by Moses L. Chase, 57 Curlew Road, Quincy, and associates, plans operation of local factory for manufacture of pumping machinery and parts, engine equipment, etc.

Merrimac Chemical Co., Everett, Mass., has awarded general contract to P. J. MacNaughton & Co., 711 Boylston Street, Boston, for two-story plant unit for production of nitric acid, to cost over $75,000 with equipment. Company has work under way on reconstruction of different units to replace a fire loss of several months ago, and will carry out expansion at same time. Work is scheduled for completion in October, when plant at Woburn, Mass., will be removed to Everett and production concentrated there. Company is affiliated with Monsanto Chemical Co., St. Louis.

George T. Smith, chairman of school building committee, New Canaan, Conn., is asking bids on general contract until Feb. 19 for two-story and basement junior high school, for which a manual training department has been authorized, to cost about $280,000. John N. Pierson & Son, 198 Jefferson Street, Perth Amboy, N. J., are architects.

Loring Coes Co., Worcester, Mass., has been organized with capital of $75,000 to take over and expand Loring Coes & Co., Inc., manufacturer of machine knives, tools, etc., with local plant. Fred C. Brigham is president of new company and James H. Colto, treasurer.

Uncas Beverage Co., Higganum, Conn., plans installation of conveying equipment, automatic bottling machinery and other equipment for rebuilding plant recently destroyed by fire, for which bids have been asked on general contract. New unit will be 75 x 125 ft., to cost over $45,000 with equipment.

American Electric Power Corpn., 120 Broadway, New York, has acquired a controlling interest in Newport Gas Light Corpn., Newport, R. I., capitalized at $1,000,000, operating artificial gas plant and system. New owner will operate as a unit of organization and plans expansion.

R. L. Davis Electric Co., Inc., Wallingford, Conn., informs THE IRON AGE that an item in Jan. 15 issue stating that it will build a new plant is incorrect. Company's business is an electrical engineering service for wire manufacturers, and it does very little manufacturing.

Getchell Foundry & Machine Works, Oakland, Me., has plans for a three-story foundry and wood-turning mill, to replace property recently destroyed by fire.

Carbonized Coal Co. contemplates erecting a 100-ton a day capacity coal manufacturing plant at Bristol, Conn., 200-ton capacity at Bridgeport, Conn., and 200-ton capacity at New Haven, Conn.

Equipment of Lamb Knitting Machine Co., Chicopee Falls, Mass., was sold at auction Jan. 27 and 28, including milling machines, shapers, boring mills and other tools.

Philadelphia

CONTRACT has been let by Ajax Metal Co., 46 Richmond Street, Philadelphia, to M. Ward Easby, Inc., 1705 Race Street, for a new two-story unit, to cost $115,000 with equipment, part of structure to be used for storage and distributing service.

Barrett Co., Thirty-sixth Street and Grays Ferry Avenue, Philadelphia, manufacturer of roofing products, etc., has asked bids on additions to local plant, including two three-story structures, 56 x 115 ft., and 46 x 115 ft., respectively, and two one-story units, 50 x 140 ft., and 45 x 141 ft., to cost over $150,000 with equipment.

Allegheny Body Co., Philadelphia, recently organized by Jacob Sucknow, 4628 North Tenth Street, and associates, plans operation of local works for manufacture of automobile bodies; a repair department will be included. Samuel Mozocant, 5004 North Bingham Street, is interested in new organization.

Carborundum Co., 4865 Stenton Avenue, Philadelphia, manufacturer of abrasive materials, grinding wheels, etc., with main plant at Niagara Falls, N. Y., has leased a floor in new factory building at Thirty-second Street and Allegheny Avenue, for local factory branch and distributing plant.

Autocar Co., Ardmore, Pa., manufacturer of motor trucks, parts, etc., has approved plans for a new factory branch, distributing, service and repair plant at Providence, R. I., to cost over $85,000 with equipment.

Lower Merion Township School Board, Ardmore, Pa., plans installation of manual training equipment in new two and three-story high school to cost $750,000, for which plans will be drawn by Savery & Scheetz, Stephen Girard Building, Philadelphia, architects.

Thermoid Co., Whitehead Road, Trenton, N. J., operating Thermoid Rubber Co., same address, manufacturer of brake lining, etc., has purchased Woven Steel Hose & Rubber Co., Prospect Street, manufacturer of molded air-brake hose and kindred products, and will operate as a subsidiary.

John A. Roebling's Sons Co., Roebling, Trenton, N. J., manufacturer of wire rope, etc., has awarded a general contract to J. A. Reading, 315 Ardmore Avenue, for one-story addition, to cost close to $40,000 with equipment.

Walter H. Fritz & Co., Reading, Pa., has been formed by Walter H. Fritz, 2307 Penn Avenue, West Lawn, Pa., to operate a local plant for manufacture of heating and plumbing equipment. Paul H. Fritz, 11 South Fourth Avenue, West Reading, Pa., is treasurer.

International Pipe & Mining Co., organized by Herbert Kennedy, head of Herbert Kennedy Co., 122 East Forty-second Street, New York, cast iron pipe, and associates, has purchased former plant of Penn Seaboard Steel Corpn., New Castle, Del., and will remodel for manufacture of cast iron pipe under centrifugal method. Facilities will be provided for output of about 150,000 tons a year. Company is identified with Pont-à-Mousson company, Nancy, France. Mr. Kennedy will be president.

Buffalo

BOND issue of $20,000,000 has been authorized by Buffalo General Electric Co., Electric Building, Buffalo, part of proceeds to be used for expansion and improvements in power plants and system. Company also proposes early sale of stock issue totaling $11,200,000, part of fund to be used for similar purposes. It is a unit of Niagara-Hudson Power Corpn., same address.

I. N. Beeler Co., Inc., Syracuse, N. Y., has been organized with capital of $50,000 to take over and expand company of same name with headquarters in Hills Building, manufacturer of equipment for electric and hydraulic power plants. New company is headed by Irving N. Beeler.

Buffalo Marine Construction Co., foot of Michigan Avenue, Buffalo, operating works for repair and remodeling of lake steamers and boats, is planning to rebuild part of plant recently destroyed by fire, with loss over $50,000 including a quantity of equipment being stored at plant for installation in boats.

Standard Oil Co. of New York, 1103 Elk Street, Buffalo, has filed plans for a control station and pumping plant at local storage and distributing plant, to cost over $21,000 with equipment.

Officials of International Business Machines Corpn., Endicott, N. Y., have organized a new subsidiary to manufacture weighing and counting scales for both heavy and light products. Part of Endicott plant will be given over to new line of production and complete precision and other equipment provided. New unit will be separate from Dayton Scale Co., Dayton, Ohio.

Goodyear-Wende Oil Corpn., 26 Lansing Street, Buffalo, operating oil storage and distributing plants, has arranged for increase in capital from $500,000 to $750,000, part of proceeds to be used for expansion.

South Atlantic

CONTRACT has been let by Southern Oxygen Co., Inc., 209 Fallsway, Baltimore, manufacturer of industrial oxygen, etc., to General Garage Mfg. Co., 1623 North Aisquith Street, for one-story plant to cost about $20,000 with equipment.

Conowingo Power Co., Conowingo, Md., has been organized to take over and consolidate Conowingo Electric Light & Power Co. of that place, and Northern Maryland Power Co., operating at Elkton, Aberdeen and Havre de Grace, Md. Consolidated company will have assets totaling $555,000. New organization plans a stock issue for acquisition of property and extensions and improvements, including transmission lines.

Baltimore Body Corpn., Baltimore, care of Albert W. Grimmer, 3309 Virginia Avenue, secretary, recently organized by Mr. Grimmer and associates, is selecting site for new plant for manufacture of automobile bus bodies, truck bodies, etc.

Chief of Engineers, Municipal Building, Washington, is asking bids until Feb. 10 for one truck crane, with 24-ft. boom and 8-ft. extension; specifications on file.

Delgado Mills, Wilmington, N. C., recently purchased by Seaboard Public Service Co., 72 West Adams Street, Chicago, an Insull utility interest, has engaged Robert & Co., Bona-Allen Building, Atlanta, Ga., engineers, to prepare plans for electrification of textile mill in connection with installation of additional machinery.

Slaysman & Co., 801 East Pratt Street, Baltimore, manufacturers of power presses, can-making machinery and other specialties, are planning one-story addition, 25 x 57 ft., to cost about $20,000 with equipment.

Georgia Power Co., Electric Building, Atlanta, Ga., is arranging appropriation of $21,000,000 for extensions and improvements in plants and system during year, including betterments in generating stations on Tallulah and Tugalo Rivers, and at Bartlett's Ferry and Goat Rock on Chattahoochee River, near Columbus, with installation of additional equipment. Program also includes construction of new high-tension transmission line from power plant at Tallulah Falls to Augusta, Ga., and vicinity. Company engineering department will be in charge.

General Purchasing Officer, Panama Canal, Washington, will receive bids until Feb. 11 for transmission line towers, until Feb. 12 for valves, wire, cable, pipe fittings, bolts, chain shackles, etc.

John C. Louis & Co., Inc., 221 South Eutaw Street, Baltimore, contractors' equipment and supplies, has leased one-story building at 511-17 West Pratt Street, totaling about 72 x 158 ft., for new storage and distributing plant.

Consolidated Gas, Electric Light & Power Co., Lexington Building, Baltimore, is arranging a fund of $8,300,000 for extensions and improvements in properties during 1931. About $5,540,000 will be used for expansion and betterments in electric light and power plants and system; $2,020,000 for similar development in artificial gas plants, pipe lines, etc., and $730,000 for extensions in central steam heating system in downtown district. About $400,000 will be expended for a steel tower transmission line for connection with high-tension system from new hydroelectric generating plant in course of construction at Safe Harbor, Pa., by Safe Harbor Power Co., an affiliated organization.

Southeastern Machine Co., Atlanta, Ga., recently organized to take over company of same name, with local plant for manufacture of textile machinery, and Greenville Spindle & Flyer Co., Greenville, S. C., manufacturer of kindred equipment, is planning enlargement in last-noted plant, including department for remodeling and repairs to textile machinery. George F. Andrews is president.

Milwaukee

PLANS are being completed by Alvord, Burdick & Howson, consulting engineers, 20 North Wacker Drive, Chicago, for an addition to municipal pumping station and filter beds at South Milwaukee. Bids will to taken about March 1. Cost is estimated at $75,000. H. Daehling is city clerk.

American Plywood Co., New London, Wis., manufacturer of veneers, plywood, cabinets, etc., has plans for a one-story extension, 70 x 160 ft., to cost $50,000 with machinery, motors, etc. Frank L. Zaug is general manager.

Board of Education, New London, Wis., is taking bids until Feb. 5 for construction of new $150,000 high school, with vocational facilities, designed by Smith & Brandt, architects. Appleton and Manitowoc, Wis. R. J. McMahon is secretary of board.

Allis-Chalmers Mfg. Co., Milwaukee, will do considerable retooling at its branch plant at LaCrosse, Wis., devoted to production of tractor implements, preparatory to placing in production a lightweight tractor plow, a two and four-row cultivator and a new disk for wheat-fields.

Hamilton-Beach Mfg. Co., Racine, Wis., manufacturer of fractional horsepower motors and electric household appliances, has acquired Arnold Electric Co., Racine, manufacturer of electric soda fountain mixers and similar products. In addition, Gilchrist Mfg. Co., Newark, N. J., a subsidiary of Scovill Mfg. Co., Waterbury, Conn., is being merged with Arnold operation at Racine. Eventually Arnold-Gilchrist division will be consolidated with the Hamilton-Beach plant by erection of additions. Capital stock of the Hamilton-Beach company has been increased from $300,000 to $950,000. T. B. Meyers is general manager.

Frank Hamachek Machine Co., Kewaunee, Wis., manufacturer of pea harvesters, viners and viner feeders, has awarded contract to Austin Co., Cleveland, for design and construction of a new foundry, 60 x 80 ft. and two-story machine shop, 60 x 140 ft. An investment of $75,000 is involved.

Chicago

PLANS are under way by Miller, Bryant, Pierce & Co., 223 South River Street, Aurora, Ill., manufacturer of carbon papers, etc., for a three-story addition, with part of unit four stories, to cost about $80,000 with equipment.

Kasson Steel Products Co., Chicago, has been organized with capital of $100,000 and 10,000 shares of common stock, no par value, to take over and expand local company of same name, with headquarters at 360 North Michigan Avenue, manufacturer of iron and steel specialties. New company is headed by Rutgers S. Kasson.

Ceco Steel Products Co., Builders' Exchange, Minneapolis, has awarded general contract to Naugle-Leck, Inc., Baker Arcade, for a one-story storage and distributing plant, 132 x 149 ft., with boiler house and other facilities, to cost over $10,000 with equipment.

State Board of Education, Capitol Building, Des Moines, Iowa, has plans for a one-story steam power house, 54 x 135 ft., at Iowa State Teachers' College, Cedar Falls, Iowa, to cost over $250,000 with equipment. E. E. Cole, Cedar Falls, is architect.

Western Feldspar Milling Co., Denver, is considering a new feldspar grinding mill at Canon City, Colo., to cost over $100,000 with machinery and other equipment.

Colorado Natural Gas Co., 27-31 Independence Building, Colorado Springs, Colo., Arthur K. Lee in charge, plans call for bids in March for a pipe line from Lamar to Colorado Springs, to cost over $1,500,000, including compressor stations and other equipment. Company also contemplates pipe line from Canon City to Colorado Springs, to cost close to $1,000,000.

Board of Education, Quincy, Ill., plans installation of manual training equipment in new four-story high school to cost more than $1,000,000, for which bids will

be asked at once on general contract. John D. Chubb, 309 North Dearborn Street, Chicago, is architect. Behrens-meyer & Hafner, W.C.V. Building, Quincy, are associate architects.

Southern Colorado Power Co., Pueblo, Colo., has authorized a fund of $275,000 for extensions and improvements in power substations and transmission lines at Pueblo, La Junta, Fowler and vicinity, including installation of additional equipment. Company engineering department is in charge. William N. Clerk is general manager.

H. E. Henley, 802 Foshay Tower Building, Minneapolis, is at head of project to build an artificial gas plant and system at Detroit Lakes, Minn., to cost about $70,000. Bids will be asked in February.

Colorado Fuel & Iron Co. is erecting a new building, 86 x 342 ft., to be equipped with automatic sawing, drilling, punching, polishing and printing machines for grader blades after rolling at adjacent 20-in. merchant mill. Structure will contain also equipment for making forged grinding balls of different diameters.

Gulf States

BIDS are being asked on general contract by City Council, Texarkana, Tex., for a municipal electric light and power plant and streetlighting system, to cost about $100,000. Montgomery & Ward, Harvey-Snider Building, Wichita Falls, Tex., are consulting engineers.

Construction Quartermaster, Maxwell Field, Montgomery, Ala., has awarded general contract to Ogletree Construction Co., Anniston, Ala., for four airplane hangars, each 110 x 220 ft., with repair and reconditioning facilities, to cost about $167,000.

Officials of United Gas Corpn., Fort Worth, Tex., have organized United Gas Public Service Co., with capital of $3,000,000 and 2,500,000 shares of common stock, no par value, to develop and extend pipe lines and service of parent corporation, an interest of Electric Power & Light Corpn., 2 Rector Street, New York. Program will include extension of natural gas distribution in other districts.

Roman Catholic Diocese, New Orleans, has taken bids on general contract for two-story addition, 128 x 145 ft., at Hope Haven Mechanical and Industrial School, Marrero, La., to cost over $150,000 with equipment. A. S. Montz, 740 Poydras Street, New Orleans, is architect.

Humble Oil & Refining Co., Houston, Tex., has purchased oil properties of Edward W. Bateman in Rusk County Oilfield, for price of $2,100,000 and plans expansion in that territory, including pipe lines.

Board of Education, Galveston, Tex., is planning installation of manual training equipment in new multi-story junior high school for which a fund of $300,000 has been arranged. Giesecke & Harris, Norwood Building, Austin, Tex., are architects; R. R. Rapp, Guaranty Building, Galveston, is associate architect.

San Antonio Public Service Co., San Antonio, Tex., is planning expansion and improvements, to cost $500,000, including extensions in power substations and transmission lines. C. H. Kifer is company engineer in charge.

Houston Oil Co., Houston, Tex., has purchased oil properties of Bay Oil Co., in Saxet field, about 5 miles from Corpus Christi, Tex., and will consolidate with other holdings in that district. Purchasing company plans expansion in acquired land, including pipe lines.

Malehow & Sons Box & Crate Mfg. Co., Cullman, Ala., will rebuild one-story plant, 40 x 170 ft., recently destroyed by fire, and plans installation of rip saws, cutoff saws, drag saws, planing mill, grooving machine, stapling machine and other tools. F. Malehow is head.

Ouachita Parish School Board, Monroe, La., contemplates installation of vocational training facilities in new three-story junior college to cost $250,000, for which bids will be asked on general contract in February. J. W. Smith & Associates, Ouachita National Bank Building, are architects.

Houston Lighting & Power Co., Houston, Tex., is arranging a new bond issue of $4,000,000, part of proceeds to be used for expansion and improvements in power plants and system. Company is operated by Electric Bond & Share Co., 2 Rector Street, New York.

Southwest Food & Refrigeration Co., Tampa, Fla., is considering a one-story ice manufacturing and cold storage plant, to cost close to $100,000 including machinery.

Chevrolet Motor Co., 2044 West Grand Boulevard, Detroit, has leased building on Nineteenth Street, Birmingham, for factory branch, repair and distributing plant for motor truck bodies.

Louisiana Coca-Cola Bottling Co., Canal and North Robertson Streets, New Orleans, plans installation of conveying, bottling and other equipment in new plant, consisting of two one-story units, 60 x 145 ft., and 73 x 76 ft., to cost over $40,000 with equipment.

Chicago, Burlington & Quincy Railroad, 547 West Jackson Boulevard, and Chicago, Rock Island & Pacific Railroad Co., 179 West Jackson Boulevard, Chicago, contemplate joint construction of new freight terminal at Dallas, Tex., to cost about $500,000 including elevating, loading, conveying and other equipment. Company engineering departments are in charge.

St. Louis

SPECIAL election has been called on March 3 by City Council, Caruthersville, Mo., to approve bond issue for $90,000 for a municipal power plant.

Phillips Lumber Co., Eureka Springs, Ark., plans rebuilding machine shop recently destroyed by fire.

Morgan Oil Co., Ponca City, Okla, has acquired oil refinery of Tonkawa Refining Co., Tonkawa, Okla., and will operate as branch plant. Improvements will be made to cost about $25,000 to develop capacity of 4000 bbl. daily. Fred Morgan is president.

J. B. Killian, 3115 Neosho Street, St. Louis, and associates have organized Railway Safety Derailment Control, Inc., with capital of $200,000, and will operate local plant for manufacture of patented railroad equipment and devices.

City Council, Fairfax, Okla., is considering a report submitted by V. V. Long & Co., Colcord Building, Oklahoma City, engineers, for extensions and improvements in municipal electric light and power plant, including installation of 750-hp. engine unit and auxiliary equipment.

Board of Education, 911 Locust St., St. Louis, has authorized plans for a high school at Kingshighway and Arco Street to cost $900,000, and will have manual training facilities. Emil J. Ittner is president of board.

Central Power Co., Grand Island, Neb., is planning extensions and improvements in power stations and transmission lines at Kearney, Neb., and vicinity to cost about $100,000 including equipment. Work will be part of 1931 expansion program. Company engineering department in charge.

Covington Coal Co., Fort Smith, Ark., is considering new coal briquette plant at Covington coal mines, near Tahoma, Okla., operated under lease, to utilize slack coal from property, to cost over $40,000 with equipment.

City Council, Little Rock, Ark., is negotiating for property adjoining present airport and plans expansion, including new hangars, repair shop and other field units, to cost over $75,000. E. E. Stansberry is city engineer.

Arkansas-Missouri Power Co., Blytheville, Ark., contemplates construction of power dams on Spring River, Fulton County, for a proposed hydroelectric power project to cost over $325,000. Company engineering department in charge.

Chandeysson Electric Co., 4092 Bingham Avenue, St. Louis, manufacturer of electric motors, generators, etc., contemplates installation of a traveling crane in one-story addition, 80 x 200 ft., for which bids have been asked on general contract, to cost about $40,000 with equipment.

Sherman Machine & Iron Works, 18-36 East Main Street, Oklahoma City, has secured contracts for iron pipe for waterworks extensions at Lawton, Okla., totaling $611,500, and is considering installation of additional equipment, including portable cranes of 2 to 3 tons capacity.

Cleveland

BIDS have been asked on general contract by International Harvester Co., 606 South Michigan Avenue, Chicago, for new one and two-story plant at Toledo, Ohio, totaling 100,000 sq. ft. floor space, to cost about $250,000 with equipment. Portion of unit will be used for storage and distribution. It will replace present branch plant at 384 South Erie Street. National Supply Co., 3320 Bishop Street, manufacturer of oil, gas and water well equipment, has leased South Erie Street property, when vacated, for expansion.

Peach Porcelain Co., East Liverpool, Ohio, manufacturer of electrical porcelain products, is planning rebuilding of portion of plant recently destroyed by fire, with loss reported over $75,000 including machinery. Harry W. Peach is president.

General Electric Co., Nela Park, Cleveland, is asking bids on general contract until Feb. 2 for one and two-story addition, 320 x 370 ft., including one-story power house, 60 x 80 ft., to cost close to $500,000 with equipment. New unit will be used for wire production and other service. Company engineering department is in charge.

Gorrell-Carnes Foundry Co., Lima, Ohio, manufacturer of gray iron castings, etc., is planning to rebuild part of plant recently destroyed by fire, with loss about $35,000 including equipment.

City Council, Conneaut, Ohio, plans in-

stallation of pumping and other power equipment for extensions and improvements in municipal waterworks to cost $75,000.

Pittsburgh

CONTRACT has been let by Calorizing Co., Wilkinsburg, Pa., manufacturer of metal tubing, alloy metals, etc., to Austin Co., Cleveland, for foundry and pattern storage building, 96 x 132 ft., part two stories, to cost $30,000.

Pennsylvania Railroad Co., Pennsylvania Station, Pittsburgh, has asked bids on general contract for a new river-rail coal terminal and distributing plant at Baden, Pa., on Ohio River, to include installation of elevating, conveying, loading and other equipment, to cost over $300,000. Company engineering department is in charge.

Sharpsburg Foundry Co., Sharpsburg, Pa., recently organized with capital of $100,000, will take over and expand company of same name with headquarters at 1837 Canal Street, Pittsburgh, manufacturer of iron and other metal castings. New company is headed by Joseph C. Kotoush, 464 North Avenue, Millvale, Pa., and William Knobel, 404 Griffin Avenue, Mount Oliver, Pa.

Board of Education, McKeesport, Pa., has authorized plans for a new industrial school, designed to teach 28 mechanical and affiliated trades, with capacity of 1500 students, to cost $800,000 with equipment. Dr. J. B. Richey is superintendent of schools, in charge.

Duquesne Light Co., 435 Sixth Avenue, Pittsburgh, is planning installation of electric precipitation equipment at different steam-electric power plants for elimination of dust from smoke stacks. Company engineering department is in charge.

Duquesne Steel Foundry Co., Pittsburgh, has been organized to take over local company of same name, with headquarters in Union Bank Building, manufacturer of steel and other metal castings. Incorporators of new company include James H. Boyd, 1724 Oliver Building, who will be treasurer; B. P. and D. C. Bakewell, Centennial and Boundry Streets, Sewickley, Pa. Plant is located at Coraopolis. Company has recently secured an order for 900 tons of cast steel segments for new vehicular tunnel under East River, New York.

Indiana

BOARD OF EDUCATION, Richmond, contemplates installation of manual training equipment in new two-story and basement high school to cost about $125,000, for which bids are being asked on general contract until Feb. 5. Hamilton, Fellows & Nedved, Tower Court, Chicago, are architects.

Andrew A. Reed, Jeffersonville, and associates have organized Reed Electro-Automatic Time Switch Corpn., with capital of $25,000, and plan operation of factory for manufacture of electric-operated time swiches and other electrical apparatus. John K. Magee, Jeffersonville, is interested in new organization.

H. G. Christman Co., 306 South Notre Dame Avenue, South Bend, general contractor, has plans for a one-story equipment storage and distributing plant, 90 x 150 ft., to cost about $35,000 with equipment. Erection will be carried out by day labor.

Hubbard Steel Foundry Co., Inc., Indianapolis, care of Burrell Wright, 1512 Merchants' Bank Building, attorney, recently formed, plans operation of local foundry for manufacture of castings.

Board of Education, La Porte, contemplates installation of manual training equipment in two-story and basement high school addition to cost about $125,000, for which plans will be prepared by George W. Allen, La Porte Savings Bank Building, architect.

Rubber-to-Metal Corpn., Auburn, care of E. B. Crane, Auburn, recently organized, plans operation of local factory for production of metal products, etc. Mr. Crane will be an official of company. E. B. Crane, Auburn, is also interested in project.

Auction sale of land, buildings and equipment of Chard Lathe Co., Newcastle, was held Jan. 27 under management of Industrial Plants Corpn., Columbian Building, Columbus, Ohio.

Cincinnati

BIDS will soon be asked by Colonial Stages, Inc., 2123 Highland Avenue, Norwood, Cincinnati, for one and two-story motor bus service, repair and garage building, 127 x 292 ft., to cost over $125,000 with equipment. J. E. Branson, Union Trust Building, is mechanical engineer.

American Rolling Mill Co., Middletown, Ohio, has arranged with William H. Moseley, vice-president, Poston-Springfield Brick Co., Springfield, Ill., to manufacture a metal curb for street use, recently patented by Mr. Moseley, and will develop commercial production at early date; production of a metal base for highway service is also proposed later.

Harris-Seybold-Potter Co., Union Trust Building, Cleveland, manufacturer of printing machinery and auxiliary printing plant equipment, has purchased plant and business of J. T. Wright Co., 2735 Colerain Avenue, Cincinnati, manufacturer of paper punches, drills, perforators and kindred machinery, and will consolidate. Arrangements have been made for closing Cincinnati plant and removal of equipment to Dayton, Ohio, plant of purchasing company, where production will be concentrated. J. T. Wright, formerly president of acquired company, will continue with purchasing organization at new location.

Board of City Trustees, City Hall, Walton, Ky., G. K. Nicholson, chairman, will receive bids until Feb. 3 for equipment for municipal waterworks, including pumping station and elevated steel tank and tower, 75,000 to 100,000-gal. capacity. C. N. Harrub Engineering Co., Fourth and First National Bank Building, Nashville, Tenn., is engineer.

Tennessee Copper & Chemical Co., Copperhill, Tenn., has work under way on expansion and improvements, including new buildings and equipment for production of sulphuric acid and kindred products, to cost over $1,500,000. Work is scheduled for completion by close of 1931.

Federal Public Service Corpn. of West Virginia, Inc., recently organized with headquarters at Ashland, Ky., will take over and consolidate Hamlin Water, Light & Fuel Co., Hamlin, W. Va.; Hurricane Light & Power Co., Hurricane, W. Va., and light and power properties of P. O. Crawford, Fort Gay, W. Va. Purchasing company is planning expansion and improvements, including transmission lines.

Board of Education, Covington, Ky., contemplates installation of manual training equipment in new Lincoln-Grant high school for colored students, for which sketches and proposals are being asked, to cost $200,000.

Contracting Officer, Wright Field, Dayton, Ohio, is asking bids until Feb. 17 for three power bumping hammers; until Feb. 11 for 125 propeller blades and 25 oxygen liquid vaporizers; until Feb. 6 for 71 metal storage racks; until Feb. 9 for 940 running light assemblies and 400 compass lamp assemblies; until Feb. 4, for 650-lb. aluminum cast welding compound and 650-lb. aluminum sheet welding compound and until Feb. 16 for 12 bomb release handle assemblies.

Detroit

BOARD OF WATER COMMISSIONERS, 735 Randolph Street, Detroit, plans call for bids in February for electric generator station, boiler house, machine shop, and automobile service, repair and garage building, to cost over $150,000 with equipment. Engineering department of board is in charge.

United States Rubber Co., 6670 East Jefferson Street, Detroit, manufacturer of automobile tires and tubes, etc., has acquired controlling interest in Gillette Rubber Co., Eau Claire, Wis., and Samson Tire & Rubber Co., Los Angeles. Plants will be continued in operation and increased capacity carried out, including facilities for 25 per cent advance at Eau Claire mill, and for doubling present capacity at Los Angeles plant. Company will also increase production at Detroit mill, entire project to cost over $150,000. J. F. O'Shaughnessy is general manager of tire division.

Gear Grinding Machine Co., Christopher and Conant Streets, Detroit, has approved plans for new one-story unit at Hamtramck, to cost over $50,000 with equipment. L. R. Hoffman, Grosse Pointe Park, is architect.

Consumers Power Co., Jackson, Mich., has purchased about one square mile at Bay City, Mich., fronting on Saginaw River, as site for a new steam-operated electric generating plant to be erected later. Project will consist of several units to develop an ultimate capacity of about 500,000 hp., and will cost over $8,000,000 with steel tower transmission system. Company engineering department will be in charge.

Best Mfg. Co., Inc., Detroit, has been organized with capital of $25,000 to take over and expand company of same name, with plant at 1306 Holden Street, manufacturer of plumbers' brass goods and kindred metal products. Incorporators of new company include James R. Miller and Benjamin Rhodes.

Detroit Brass & Malleable Co., 1177 Holden Street, Detroit, has awarded general contract to W. F. Block, Wyandotte, Mich., for a one-story addition to Wyandotte plant, to cost over $40,000 with equipment.

Heinze Laboratories, Inc., 132 East Larned Street, Detroit, recently organized, plans operation of local mill for production of engines, turbines, mechanical and electric equipment.

Board of Education, Battle Creek, Mich., contemplates installation of manual training equipment in Southeastern junior high school to cost $300,000, for which plans are being completed by Albert Kahn, Inc., Marquette Building, Detroit, architect and engineer.

Pacific Coast

PLANS are under way by Atchison, Topeka & Santa Fe Railway Co., Kerckhoff Building, Los Angeles, for one-story shop at locomotive repair plant at Richmond, Cal., to cost over $45,000 with equipment. M. C. Blanchard, address noted, is chief engineer.

San Francisco Bay Airdrome, Webster Street, Alameda, Cal., has awarded general contract to Lindgren & Swinerton, Inc., 225 Bush Street, San Francisco, for one-story all-steel hangar, 150 x 160 ft., with shop facilities, to cost $75,000. R. F. McClellan is field manager in charge.

Union Packing Co., 2030 East Vernon Avenue, Los Angeles, meat packer, has awarded general contract to Ted R. Cooper Co., Inc., Western Pacific Building, for a two-story and basement addition, 98 x 112 ft., to cost over $85,000 with equipment. A pre-cooling plant will be installed.

Board of Education, Pasadena, Cal., contemplates installation of vocational training department in new Charles W. Eliot Junior High School, for which plans have been drawn by Marston & Maybury, 25 South Euclid Avenue, architects.

Boeing Air Transport Co., a subsidiary of Boeing Airplane Co., Georgetown Station, Seattle, has leased one-story hangar, 80 x 100 ft., to be erected by City Council, Sacramento, Cal., at local municipal airport, for which general contract has been let to Lindgren & Swinerton, Inc., California State Life Building, Sacramento. Boeing company will provide repair and reconditioning department. Unit will cost about $50,000. Harry Devine, 1105 Forty-first Street, Sacramento, is architect.

City Council, Idaho Falls, Idaho, has applied for permit for a municipal hydro-electric generating plant on Snake River, consisting of two power dams and two generating stations to develop 19,000-hp. capacity, to cost close to $2,000,000 with transmission system.

Oregon Brass Works, Inc., Portland, has purchased property at East Ninth, East Tenth, Taylor and Salmon Streets for new one-story plant, to cost over $50,000 with equipment. W. A. Prier is assistant manager.

Hope Mining Co., Coeur d'Alene, Idaho, O. A. Holte, president, has plans for a new reduction mill at mining properties and will also carry out electrification program, to cost over $125,000.

Foreign

NEW interests have acquired part of stock of North German Petroleum, A.G., Hanover, Germany, totaling 2,200,000 m. (about $528,000) and considerable part of fund will be used for erection of oil refinery, including storage and distributing facilities.

Imperial International Communications, Ltd., Johannesburg, South Africa, has closed agreement with Rhodesian Government for erection and operation of a high-power wireless station at Salisbury, Southern Rhodesia, where Government will provide site of about 175 acres, rent free. Project will include broadcasting and receiving station, including facilities for telephony, television and facsimile transmission, with electric power station, aerial system, machine shop and other operating units. Work will begin within three months and is scheduled for completion within 18 months.

Public Works Department, Porto Alegre, Brazil, is planning call for bids within 60 to 90 days for railroad from Port of Torres to Port Alegre, about 320 kilometers (about 200 miles) in connection with Government project to open first noted port, to cost $13,000,000. Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference Brazil 1.12.31.

Compania Saltitrera Balkan, Valparaiso, Chile, recently organized with capital of $5,100,000, is planning development of nitrate properties near Tocopilla, Province of Antofagasta, where holdings of former Balkan group have been acquired, known as Prat Oficinas 1 and 2, and Nueva Chile. New company proposes operation of large plant in that district.

Anglo-Persian Oil Co., Ltd., London, England, Sir John Cadman, chairman, with New York offices at 25 Broadway, has arranged with governments of Palestine and Trans-Jordania through its affiliated organization, Iraq Petroleum Co., for pipe line across desert from Bagdad to Mediterranean Sea, about 1000 miles, for oil transmission from Iraq oil-fields. Two main distributing and storage plants will be built at Tripoli, Syria, and Haifa, Palestine. Royal Dutch Co., Amsterdam, Holland, is interested in project, which will cost over $10,000,000.

Alloy Welding Processes, Ltd., and Premier Electric Welding Co., Ltd., London, have been merged under name of Murex Welding Processes, Ltd., Forest Road, Walthamstow, London, E. 17.

Canada

CITY Council, Ottawa, Ont., contemplates purchase of new pumps for waterworks station to cost $56,000. W. E. MacDonald, City Hall, is engineer.

Bids will be called in spring or early summer for an addition to power plant at Edmonton, Alta., for City Council, to cost $450,000. J. Martland, Civic Block, is architect.

Beatty Bros., Ltd., Ferguson, Ont., will spend $100,000 on plant additions, consisting of two one-story buildings, 50 x 150 ft.

Canada Cement Co., Ltd., 610 Cathcart Street, Montreal, will start work next June on reconstruction of its plant in Humberstone Township, Ont., to cost $500,000. New wet process of manufacture will be installed. L. M. McDonald, Steel Street, Port Colborne, Ont., is superintendent.

William Kennedy & Sons, Ltd., 1114 First Avenue West, Owen Sound, Ont., will erect a plant, 40 x 60 ft., at North Bay, Ont., for manufacture of steel grinding balls for mining industry. Equipment will be purchased.

Welch & Davis, Ltd., 1277 Wellington Street, Ottawa, Ont., is contemplating erection of an automobile body building and repair plant at North Bay, Ont.

Toronto Brass Machine & Foundry Co., 74 Market Street, Toronto, has plans for new one-story works. Site has not yet been purchased.

Acimite Insulation Corpn., Ltd., Canada Permanent Building, Bay Street, Toronto, will establish a plant at Trenton, Ont., for manufacture of insulating materials for refrigerators, buildings, pipe coverings, etc.

New Trade Publications

Purite.—Mathieson Alkali Works, Inc., New York. A two-page leaflet gives recent information as to the use of this modern flux in the production of iron castings.

Ventilation.—American Rolling Mill Co., Middletown, Ohio. An eight-page bulletin describing the ventilating system in the general science building of Antioch College, Yellow Springs, Ohio. Both ventilating and exhaust ducts for chemical fumes are included in the installation, the exhaust ducts being in 27 of the 103 rooms in the building. Features of the system include all duct work of ingot iron and easy access to the ventilating system, plumbing and electrical service of the building through removable partitions in the corridors. The ducts are all built in a straight line to the attic, so that a spray painting machine may be lowered through them when inspection indicates painting to be necessary. Because of the lightness of sheet metal ducts, it was possible to suspend the two large collectors in the attic high enough to permit walking beneath them.

Management Reports.—Metropolitan Life Insurance Co., New York. A 60-page booklet listing more than 400 articles and reports on problems of management published by the Policyholders' Service Bureau. Among the reports listed are: "Budgeting Manufacturing Operations," "Vacation for Industrial Workers," "Cooperative Marketing Activities in Business," "Reports for Executive Control," "Making the Plant Safe" and "First Aid in Small Industrial Plants."

Weighing.—Howe Scale Co., Rutland, Vt. A four-page bulletin describing the "Weightograph," an electrically illuminated indicator, which may be attached to any scale. Advantages of the device are listed as automatic balance, eliminating the human element in balancing a load, speed and accuracy, and absence of distortion sometimes occurring from reading at an angle.

Steel Lockers.—Durabilt Steel Locker Co., Aurora, Ill. A 16-page booklet describing installations of steel lockers in gymnasiums. It is replete with illustrations of various types of lockers and their specifications.

Belting Hose and Packing.—Diamond Rubber Co., Inc., Akron, Ohio. Catalog of 12 pages describing belting, packing, hose, matting and miscellaneous items for industrial use.

Non-Ferrous Castings.—Niagara Falls Smelting & Refining Corpn., Niagara Falls, N. Y. "Better Castings" is the title of a four-page leaflet, Vol. 1, No. 1, issued by this company, describing its various non-ferrous alloys.

British Awarded Rails for South Africa and Locomotives for India

India considers increased duties on rail accessories.

* * *

China reduces tariff on steel, machinery and locomotives.

* * *

German steel output for 12 months of 1930 was 11,538,600 metric tons.

* * *

Wire mills in Germany seek agreement with Belgian makers to adopt metal reels in export trade.

* * *

Sheffield exports of high grade steel to United States in 1930 only half the 1929 total in value.

(*By Cable*)

LONDON, ENGLAND, Jan. 26.

THE South African Government has purchased 22,000 tons of rails and 250,000 steel sleepers from Northeastern mills. One works began rolling within three days after receipt of the order. Increased pig iron production will be unnecessary for this order, as stocks will be drawn upon to make the necessary steel.

Trading generally is slack with export demand for pig iron quiet despite the willingness of makers to grant concessions in prices. Domestic users are covering only their nearby requirements.

The recent meeting of Welsh tin plate mills was uneventful, and a further meeting has been arranged for the end of February. Meanwhile the tin plate market is quiet, buyers awaiting the outcome of the negotiations.

Some inquiry is appearing from China, but export business is generally dull. Stock tin plate has been sold under 15s. 3d. ($3.70) per base box, but tin plate to be made for future delivery brings 15s. 6d. to 15s. 9d. ($3.77 to $3.80) per base box, f.o.b. works port.

British galvanized sheet makers have removed all restrictions on sales to India and are quoting all markets a uniform price of £11 per ton (2.42c. per lb.), f.o.b., for No. 24 gage corrugated sheets in bundles. Black sheets No. 24 gage are quoted at a minimum price of £8 10s. per ton (1.84c. per lb.), f.o.b.

The Vulcan Foundry, Ltd., Newton-le-Willows, Lancashire, has secured 33 locomotives for export to India.

Sheffield high grade steel exports to the United States in 1930 totaled only $460,000, compared with $1,050,000 in 1929.

The Indian Tariff Board has recommended the following duties on railroad steel: Fish bolts, nuts and ordinary bolts, nuts and dog spikes, 2 rupees, 4 annas (80c.) per 100 lb.; rivets, gibs, cotters and keys, 2 rupees (72c.) per 100 lb.

Continental markets are dull and prices are easy. Belgian mills are in need of orders, and German works are seeking increased export business, although domestic demand has improved following a price reduction and delivery delays of two to four weeks.

German output in December was 615,000 tons of pig iron, bringing the year's total production to 9,694,500 tons. At the end of the year 63 furnaces were in blast. German raw steel output was 743,700 tons, bringing the 1930 production to 11,538,600 tons, and rolled steel output was 533,000 tons, making the total for the year 8,151,000 tons.

Luxemburg output of pig iron in December was 184,000 tons, making the year's total 2,474,000 tons, and raw steel production in December was 183,000 tons, or 2,270,000 tons for the year.

New Chinese Tariff Reduces Steel Duties

WASHINGTON, Jan. 27.—The new Chinese tariff, effective Jan. 1, decreases duties on certain machinery, and iron and steel products, carrying no increase in this field except for a 7 per cent advance in the duty on nails, says a report to the Department of Commerce from Shanghai.

Among the products on which the duty is reduced are machine tools, 5 per cent, formerly 10 per cent ad valorem; airplanes, 5 per cent, formerly 22½ per cent; railroad equipment, including locomotives and tenders, 5 per cent, formerly 10 per cent.

British and Continental European Export Prices per gross ton, f. o. b. United Kingdom Ports, Hamburg and Antwerp, with the £ at $4.8665 (par)

British Prices f. o. b. United Kingdom Ports

Ferromanganese, export	£9	0s.	to	£11	5s.	$43.74	to	$54.75
Billets, open-hearth	5	10	to	6	2½	26.76	to	29.80
Black sheets, Japanese specifications	11	10				55.95		
Tin plate, per base box	0	15½	to	0	15¾	3.77	to	3.80
						Cents a Lb.		
Steel bars, open-hearth	7	15	to	8	5	1.69	to	1.79
Beams, open-hearth	7	7½	to	7	17½	1.60	to	1.71
Channels, open-hearth	7	12½	to	8	12½	1.66	to	1.87
Angles, open-hearth	7	7½	to	7	17½	1.60	to	1.71
Black sheets, No. 24 gage	8	10				1.84		
Galvanized sheets, No. 24 gage	11	0				2.42		

Continental Prices, f. o. b. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 1.00 per cent and more phos	£2	12s.	to	£2	13s.	$12.64	to	$12.88
Billets, Thomas (nominal)	£3	12s.	to	£3	13s.	$17.51	to	$17.76
Wire rods, low C., No. 5 B.W.G.	5	2½	to	5	7½	24.91	to	26.15
Rails, light	6	0				29.20		
Black sheets, No. 31 gage, Japanese	11	5	to	12	12	54.68	to	58.32
						Cents a Lb.		
Steel bars, merchant	4	2½	to	4	4	0.88	to	0.90
Beams, Thomas, British standard (nominal)	3	16	to	3	17	0.83	to	0.84
Channels, Thomas, American sections	5	12	to	5	14	1.24	to	1.26
Angles, Thomas, 4-in. and larger, over ⅜-in. thick	4	1	to	4	2	0.87	to	0.88
Angles, Thomas, 3-in.	4	4	to	4	5	0.90	to	0.91
Hoop and strip steel over 6-in. base	4	12	to	4	12½	0.98	to	0.99
Wire, plain, No. 8 gage	5	12½	to	5	15	1.24	to	1.27
Wire, barbed, 4-pt. No. 12 B.W.G.	9	7½	to	9	16	2.08	to	2.09
Wire nails, base	5	17½	to	6	0	$1.29	to	$1.30
						a keg		

Other products affected are copper bars and rods, the duty on which is reduced about 30 per cent; ingots and slabs, reduced about 15 per cent; wire, reduced 25 per cent; iron and steel plain sheets and plates, 25 per cent reduction; structural steel, 30 per cent; galvanized corrugated sheets, 8 per cent. The duty on plain galvanized sheets is unchanged.

German Mills Standardize Razor Blade Steel

BERLIN, GERMANY, Jan. 12.—German manufacturers of steel for safety razor blades are seeking to standardize the qualities of steel used for this purpose. Five mills in Germany and one Swedish company, which has a German plant, have reached an agreement with the Razor Blade Manufacturers' Association to supply standard qualities. The association is to establish a special testing laboratory, from which it will distribute steel to its members. It is believed that standardization of quality will contribute to better blades at lower costs, and in a measure meet the growing competition of foreign made razor blades.

German Plant Suspends, Refusing to Meet Union

HAMBURG, GERMANY, Jan. 14.—The Peiner Walzwerke, near Hanover, which recently refused to renew agreements with trade unions in an effort to establish an open shop, has closed and 5000 employees of the plant have been dismissed, which further increases the total in Germany receiving unemployment payments. The company has blast furnaces, iron ore mines, coal mines and a steel plant.

Krupp Interests Plan Canadian Works

ESSEN, GERMANY, Jan. 12.—The Friedrich Krupp A. G., is negotiating with certain Canadian interests for the establishment of a plant in Canada to manufacture mining and steel plant equipment. (Reported to THE IRON AGE by cable, Jan. 8). A site in the Province of Quebec is being considered, probably near Montreal, and representatives of the Krupp interests have been sent to Canada to investigate conditions.

Germans Urge Metal Reels for Wire

HAMBURG, GERMANY, Jan. 14.—Manufacturers of barbed wire have been endeavoring to introduce metal reels for wire, especially in the export trade. Except for certain overseas markets, such as South American countries and Ceylon, foreign buyers still specify wooden reels, although the metal reel is ½ per cent lower in cost, and, being lighter in weight, offers a saving in freight charges. American wire mills still use wooden reels, but German makers are negotiating with Belgium producers in an effort to have them adopt the metal reel. With additional publicity abroad, progress toward its general adoption is expected.

German Scrap Dealers Sell New Material

HAMBURG, GERMANY, Jan. 14.—The Reichsverband der freien Schrotthandler, German Federation of Iron and Steel Scrap Dealers, which has a membership of 125 companies, has entered the new steel business. Recently, members of the federation have been selling finished steel products in competition with recognized jobbers. As the scrap dealers are offering new material at lower than current warehouse prices in Germany, it appears that they have established connections with foreign makers.

Britain Using More Metal Furniture

WASHINGTON, Jan. 27.—Use of steel office and hospital furniture in Great Britain is increasing rapidly, says a report from London to the Department of Commerce. There are now twenty-nine companies in the United Kingdom, which produce between $2,000,000 and $3,000,000 worth of steel furniture annually, compared with a total of only about $260,000 worth made in 1923. Imports increased from about $365,119 in 1923 to $778,910 in 1929. American sellers have been successful in obtaining a fair share of this business.

Tariff Hearing March 3 on Farm Hand Tools

WASHINGTON, Jan. 27.—The Tariff Commission has set March 3 as the date for a hearing under the flexible provision regarding agricultural hand tools. The duty carried in the Hawley-Smoot act is 30 per cent. The investigation was ordered by a resolution offered by Senator Borah of Idaho.

Cast Iron Pipe, Fittings, at $81,535,000 in 1929

WASHINGTON, Jan. 27.—Of the total sales of $81,535,000 of cast iron pipe and fittings in 1929, industrial and other consumers took these products to the value of $47,633,000, or 58.4 per cent, according to the Bureau of the Census. The remaining sales were made as follows: 35.9 per cent, or $29,247,000, to dealers, and 5.7 per cent, or $4,655,000, to manufacturers' sales branches. Of the total, 12.9 per cent, or $10,492,000, was made through manufacturers' agents, selling agents, brokers and commission houses.

International Iron and Steel Meeting

Iron and steel is one of four major industries to be covered at a meeting of the Rotary International in Vienna, Austria, next June. The other three are cotton, wool and leather. Separate assemblies for the four industries will be held, to discuss their particular problems. It is primarily with the commercial machinery of the industries that the meeting will be concerned.

It will be the endeavor to have the assemblies run on a strictly informal basis, so that everyone in attendance may feel free to offer criticisms of practices, or suggestions for the improvement of business practices, in any particular phase of his own industry. Representation at the meetings will be of a broad international character, so that the assemblies may contribute materially, in their discussions, to the solution of world problems. At the same time the sales element will be lacking, as the presence of sample products and other items of that character will be strictly prohibited.

As chairman in charge of the organization, Dr. Herbert Schofield, British scientist and engineer and principal of Loughborough College, will officiate. Dr. Otto Boehler, managing director, Boehler Steel Works, near Vienna, is chairman of the Vienna executive committee, in charge of the convention arrangements. The American office of Rotary International is at 211 West Wacker Drive, Chicago.

River Shipments of Steel Gained in 1930

Movement of iron and steel products on the Ohio River in the Pittsburgh district in the year ended Dec. 30 totaled 1,236,906 net tons, according to the figures of the United States Engineer office, Pittsburgh. During 1929 Ohio River iron and steel shipments amounted to 1,212,912 tons.

Shipments on the Monongahela River during 1930 were 1,138,950 tons, compared with 1,203,727 tons in the preceding year. Allegheny River movement of iron and steel products amounted to 44,075 tons last year, compared with 2507 tons in 1929.

Ohio River movement during December, 1930, was 50,403 tons, compared with 95,644 tons in November and 77,885 tons in December, 1929. On the Monongahela River 46,972 tons of steel was shipped in December, 75,202 tons in November, and 60,957 tons in December, 1929. Corresponding figures for the Allegheny River were 3800 tons, 17,850 tons, and 400 tons respectively.

Arthur G. McKee & Co., Cleveland, have established an Eastern office at 120 Broadway, New York, in charge of Walter G. Mortland.

Inspecting Steel Strip Magnetically

(*Concluded from page 391*)

similarity or dissimilarity, as the case may be. The interpretation of such similarities, or lack thereof, in definite terms as to the structure and antecedent history of the unknown specimen, must obviously depend upon the nature of the "standard" which is employed in making the comparison.

The precision and consistency of magnetic indications as a means of comparison of materials have been well established, and magnetic comparisons are now being used as a practical means of commercial inspection or process control. The next step forward will be the tracing out of the causes of magnetic dissimilarities which the method discloses by studying and varying the antecedent history of the material tested. Herein lies perhaps the greatest value of the method as an aid to the research worker or plant investigator, as the magnetic properties of the material can be ascertained at any stage of its processing without destroying or impairing the value of the material.

[All microstructures are reduced about half from the originals—Editor.]

Typical Installations of Coreless Induction Furnaces

(*Concluded from page 399*)

chemical composition of iron and its numberless alloys that shall be as precise as that which has been obtained for most of the non-ferrous alloys.

Modern industrial needs require a melting tool which will give easily the highest temperatures ever used in practical metallurgy and not contaminate the product. It is demanded also that all the mass heated shall be heated uniformly and that at no point of the mass shall the highest temperature attained exceed that to which the whole mass is finally brought. It is most wasteful to discard or refine over again valuable ferrous scrap. Hence, the need is strongly felt for a melting furnace which can recover scrap without changing in the least its composition, and a melting furnace which will do this is certain to be increasingly sought and used.

For all requirements as stated above, and probably many more, no method of melting is conceivably more sound and basic in principle and more effective in application than the method of melting by high-frequency coreless induction. Furnaces which employ this principle will change in design, improve in construction and increase in size. They must all operate, however, obedient to the fundamental principle that, in high-frequency induction, the power absorbed by the melt is substantially proportional to the frequency used and to the square of the ampere turns of the inductor coil.

The method and the apparatus now used for supplying high-frequency power to a furnace will undoubtedly change in character and probably become cheaper and be supplied in larger units, but high-frequency power will be used as long as metals are melted because of the inherent basic principles which are used. There can be no analogy in the future development of electric inductive heating to the progress in communication where the telephone came to supplement the telegraph and the radio the telephone, because no principle of heating metals electrically can be more fundamental than the principle of sending electromagnetic wave-energy through refractories wholly transparent to energy in this form and then allowing this energy to impinge on a conducting mass which wholly absorbs it and thereby converts it into useful heat.

Selected Bibliography

General Theory and Apparatus

(Listed in order of date of publication)

"Some Newly Observed Manifestations of Forces in the Interior of an Electric Conductor," by E. F. Northrup, *Physical Review*, Vol. XXIV, No. 6, June, 1907.

"Principles of Induction Heating With High-Frequency Currents," by E. F. Northrup, *Transactions* of the American Electrochemical Society, 1919, Vol. [illegible].

"Uniform High Temperatures Throughout a Large Volume," by E. F. Northrup, *Journal of Ind and Eng Chem*, July, 1921.

"Electric Heating by Ironless Induction," by E. F. Northrup, *General Electric Review*, November, 1927.

"Conversion of Electromagnetic Energy into Useful Heat," by E. F. Northrup, Research Narrative No. [illegible], published by the Proceedings, Washington, April, 1925.

"Fours à Induction," by G. Ribaud, *Force Electrique et Chaleur*, Chapter V, Pages 225 to 270, published under the direction of Paul Lebeau.

"Developments in High-Frequency Inductive Heating," by Dudley Wilcox, *Metal Industry*, February, 1928.

"High-Frequency Induction Furnaces," by D. F. Campbell, *Transactions*, Iron and Steel Institute (British), 1927.

"A High-Frequency Induction Furnace Plant for the Manufacture of Special Alloys," by P. H. Brace, *Transactions* of the A. I. E. E., 1925.

"Inductive Heating," by E. F. Northrup, *Journal of the Franklin Institute*, February, 1928.

"Zur Kenntnis des Hochfrequenz-Induktionsofens," by Franz Wever and Wilhelm Fischer, *Proceedings* of the Kaiser Wilhelm Institute for Iron Research, 1928, Vol. 8, Part 16.

"Electricity in the Foundry," by E. R. Burch and N. E. Stevens, *Metropolitan Critics Circle*, February, 1927.

"High-Speed High-Frequency Inductive Heating," by E. F. Northrup, *Transactions* of the American Electrochemical Society, 1927.

"High-Frequency Induction Melting," by D. F. Campbell, Iron and Steel Institute (British), fall meeting, 1927. (Abstract in *Electrician*, London, Nov. 25, 1927.)

"Fours à Induction," by G. Ribaud, *Revue Universelle Engenieur*, March, 1928.

"Industrial Electric Heating," by N. B. Stansel and E. F. Northrup, *General Electric Review*, April, 1928.

"High-Frequency Alternators for Induction Furnaces," *English Electric Journal*, July, 1928.

"Fours à Induction à Haute Fréquence et à Creuset Conducteur," by Marcel Mathieu, *Acta et Motores*, September, 1928.

"I Forni a Induzione Senza Nucleo Magnetico," by L. A. Finzi, *L'Elettrotecnica*, Nov. 15, 1928.

"Entwicklungsstand des kernlosen Induktionsofens," by M. Tama ("Development Status of the Coreless Induction Furnace"). Presented at the Nov. 27, 1928, session of the Stahlwerksausschuss des Vereins Deutscher Eisenhüttenleute.

"The High-Frequency Induction Furnace for Chemical Preparations above 1000 deg. C.," by C. N. Schgotte and Chas. G. Maier, *Transactions* of the A. E. Society, 1928.

"Production of Iron and Steel in the Electric Furnace (refers mostly to ore furnaces), by Dr. Alfred Stansfield, *Steel and Furnaces*, February, 1929.

"High-Frequency Furnace Used in Melting Alloy steels," by H. N. Blakeslee, *Fuels and Furnaces*, July, 1929.

"Fortschritte im Bau von Hochfrequenz-Ofenanlagen," by M. Tama, *Stahl und Eisen*, Nov. 14, 1929.

"Elektrisk-smältugnens Plats Bland Andra I Stycken Använda Typer för Stålframställning," by C. Sefrid, *Teknisk Tidskrift*, Mech. 1930 (Swed., 8 p.).

Metallurgical

(Listed in order of date of publication)

"Decarburization of Ferrochromium by Hydrogen," by Louis Jordan and F. E. Swinden, Scientific Paper of the Bureau of Standards No. 148.

Business as Others See It

Digest of Current Financial and Economic Opinion

SOMETHING of the blighting effect on business of the interminable political palavers in the Senate is discussed by *Commerce and Finance*. "The wonder of it all is that, under such conditions, there should be any ground for optimism. But there is.

"Whether it be due to the natural hopefulness of the American people or to the calm that precedes the storm, no one can deny that the United States is giving a marvelous exposition of the financial strength which has enabled it to stand the blows it got in Congress last year, and take this chastisement administered since Congress came together after the new year.

"If we could get some really constructive and non-political legislation out of Washington, we might see almost a boom in business," is the conclusion.

Divergent Views as to Present Trend

Manufacturing volume, as measured by Harvard Economic Society, made an advance in December for the first time since April. This index is adjusted for seasonal influences. But *Electrical World* reports a decrease in industrial consumption of electricity in December.

"Resistance to further retreat," as another paper puts it, "has been evident in practically every indicator since the middle of December."

Bonds as Prognosticator

Demand for high-grade bonds is improving. Poor's Service sees this fact as a possible augury for a near-by upturn in industry. Since 1860 there have been several periods, "each marked by general business depression following a long bear market in stocks, when a sharp revival of demand for high-grade bonds has been the first important step in a prolonged recovery, and has been followed gradually by improvement in the stock market and in general business."

Wage rates come in for further analysis. *Annalist* points out that "when retail prices are generally falling, as now, the maintenance of the money wage rates of 1929 is in effect an *increase* in real wages. Is this a time when increase of wages is economically justified?" Benjamin Baker wonders.

What We May Expect

A tendency to restrain future periods of expansion and to aggravate those of depression is foreseen by Brookmire Economic Service, if the present trend of wages and prices continues. "A study of economic history shows that, in an era of rising prices, periods of good business tend to be longer than periods of depression. On the other hand, in times of falling prices, recessions tend to be prolonged."

Reasons for believing that, for all practical purposes, business has reached the bottom are noted—"though the area at low levels may be somewhat prolonged." But Brookmire says that the next major development is indicated as a new cycle, "which should carry business above normal some time in 1932."

"Some Alloys for use at High Temperatures," by W. Rosenhain and C. H. M. Jenkins, *Engineering* (British), June 6, 1930.

"Preparation des aciers speciaux au Four Electrique a haute Frequence," by M. A. Lacroix (Preparation of Special Steels in High Frequency Induction Furnace), *Journal du Four Electrique*, July, 1930.

"Elektrische Schmelzöfen für Nichteisenmetalle," by M. Tama.

Voids in Beds of Blast Furnace Materials

The pressure developed in a blast furnace depends to a large extent upon the effective area available in the charge column for gas flow. Tests conducted by the North Central Experiment Station of the United States Bureau of Mines, in cooperation with the University of Minnesota, show that many dead spaces exist in beds of solids. The effective free area of a typical blast furnace charge was calculated from the volume of gas passing through a bed and the velocity of gas in the bed. Velocity measurements in the bed showed that the gas must have been passing through only 8.15 per cent of the total volume in order to attain the measured velocities. A similar charge was found to contain 33 per cent voids, or about four times the volume through which the gas was actually moving.

CONTENTS

February 5, 1931

Alloy Steels and Irons	449
Field Balancing Problems	452
Making Corrosion-Resisting Sheets	456
Tests of Electric Welded Pipe	461
Heat-Treating in Small Plants	462
Rustless Steels in the Open-Hearth	466
Mechanical Handling of Limestone	470
Canadian Bronze Foundry	474
Large Market for American Equipment	476
Machine Tool Obsolescence	479
Dr. Haney's Page	491

▼ ▼ ▼

New Equipment	484
Editorials	492
Markets and News	495
Personals and Obituaries	515
Business as Others See It	528

▼ ▼ ▼

A PUBLICATION WITH A PERSONALITY

A PRODUCTION executive in a well-known middle western plant canceled his subscription some months ago. He has re-entered his subscription, and writes:

"I have missed THE IRON AGE so much since it has not been placed on my desk each week that I could not withhold my renewal any longer. It is peculiar that I should feel this loss so greatly, when I have other channels for getting the technical information your paper contains.

"But, I suppose, THE IRON AGE has a personality of its own and that personality becomes, after long association, a friend."

—A. H. D.

76th IRON AGE YEAR

UNITED BUSINESS PUBLISHERS INC.

W. W. MACON, *Editor*
A. I. FINDLEY, *Editor Emeritus*
G. L. LACHER, *Managing Editor*
C. E. WRIGHT, *News Editor*

E. F. CONE
S. G. KOON
R. E. MILLER
G. S. HERRICK
F. L. PRENTISS
Cleveland
R. A. FISKE
Chicago
T. H. GERREN
Pittsburgh
BURNHAM FINNEY
Detroit
L. W. MOFFETT
Washington
GERARD FRAZAR
Boston
R. G. McINTOSH
Cincinnati

IRON AGE PUBLISHING CO.
239 West 39th Street,
New York, N. Y.

Cable Address: "Ironage, N. Y."

F. J. FRANK, *President*
G. H. GRIFFITHS, *Secretary*
C. S. BAUR, *General Advertising Manager*

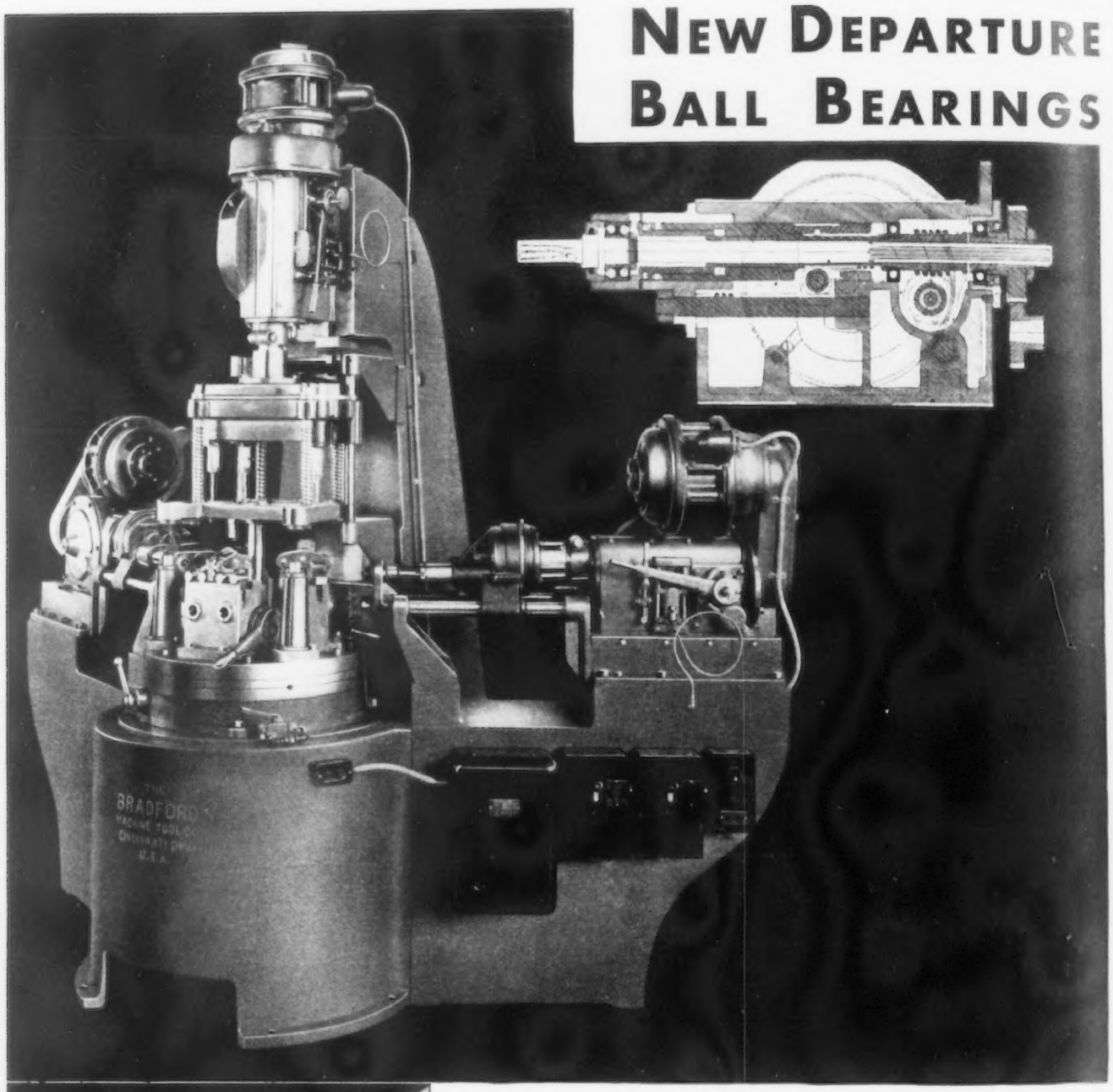
Division of
UNITED BUSINESS PUBLISHERS, INC.
New York, N. Y.

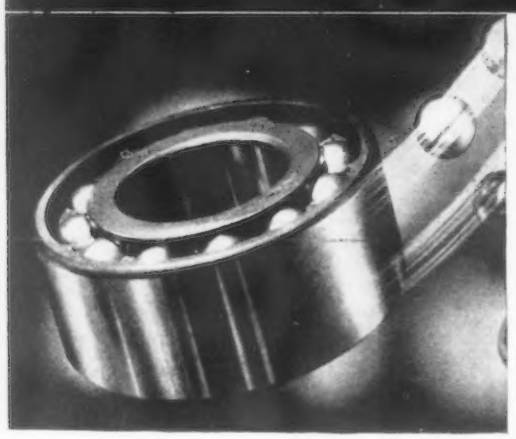
District Offices
CHICAGO, Otis Building
PITTSBURGH, 1319 Park Building
CLEVELAND, 1362 Hanna Building
PHILADELPHIA, 1402 Widener Bldg.
DETROIT, 7338 Woodward Avenue
WASHINGTON, 536 Investment Bldg.
CINCINNATI, 403 Traction Building
BUFFALO, 616 Ellicott Square
BOSTON, Room 230, 80 Federal St.
SAN FRANCISCO, 381 Bush St.

Copyright, 1930, by
IRON AGE PUBLISHING CO.

Member, Audit Bureau of Circulations
Member, Associated Business Papers
Published every Thursday. Subscription Price: United States and Possessions, Mexico, Cuba, $6.00; Canada, $8.50; foreign, $12.00 a year. Single copy 25 cents.

NEW DEPARTURE BALL BEARINGS





1681

NOTHING ROLLS LIKE A BALL

Bradford gets drilling mileage with New Departures. Every 53 seconds a valve tappet guide leaves this triple-headed Bradford machine . . . each drilled with eight holes, four of them smoothly and accurately reamed. As drilling experts, the Bradford Machine Tool Company knows the close relationship between good bearings and fast, clean drilling . . . hence the generous use of New Departure Ball Bearings. Supporting the spindle is the Double Row . . . a rigid, preloaded bearing of unit construction and high thrust capacity. The drawing shows a compactness of which *only* such a bearing is capable. With New Departure Single Rows as running mates, this Bradford unit will give years of accurate performance. New Departure ideas, like its product, are always a little ahead. The New Departure Mfg. Co., Bristol, Connecticut.

THIS ISSUE IN BRIEF

FEBRUARY 5, 1931

NEXT WEEK

HOW the Peerless Motor Car Corpn. turns over its material 30 times a year and still maintains sufficient inventory to make any of 720 different body styles in the regular processing time of 96 hr. will be told in the leading article.

Determining carbon in rustless steel, a stumbling block to metallurgists, will be discussed by an authority. The strategic location of overhead conveyors to reduce manufacturing floor space, save labor and cut plant burden charges will be the subject of another article of wide appeal.

Why the Power Bill Was High

"Unbalance" of a motor caused excessive heat, annoying vibration and high power bills. Current consumption dropped 25 per cent when motor was balanced by means of portable balancing equipment.—Page 453.

Rustless Steel Pack-Heating

To allow simultaneous cooling, furnace discharge door opens and packs are discharged at the same time.—Page 460.

Weld Intact After Seven Twists

Seven twists of electric welded pipe, with lengthwise weld, fail to fracture the weld or the pipe itself.—Page 461.

Poor Heat Treatment — Spoiled Reputations

Even the best of designs will fail miserably if heat treatment is faulty. Uniformly good results can be obtained with inexpensive equipment.—Page 462.

Rustless Steels from the Open-Hearth

With pure materials, the heat is made in the usual way. To avoid chromium loss, ferrochrome is added late, after quieting the bath with manganese and some silicon.—Page 466.

Portable Trolley Wire Poles

When track location in limestone quarry is changed, poles set in heavy concrete blocks are picked up and deposited in new location.—Page 471.

U. S. S. R. a Good Customer

In last fiscal year the Soviet Union bought over $46 millions of American industrial equipment, an increase of 51.5 per cent over the preceding year.—Page 477.

Vibration Source Located by Vibrometer

Relation between vibratory and rotary motions is indicated by red light beam on ground glass scale, permitting the operator to find at what stage of the cycle unbalance exists.—Page 452.

Waste Gas Ducts Aid Uniform Heating

Efficient flame circulation in rustless sheet pack-heating furnace is gained by use of waste gas ducts at both charging and discharging ends.—Page 459.

Expensive Die Failures

A variation of 50 deg. F. in the four corners of a small furnace may result in the loss of a die. Combustion space should have ports that can be throttled to regulate heat distribution.—Page 462.

Saves $50 a Month by Insulating

Outside of heat-treating furnaces and exhaust gas pipe has 4-in. of boiler insulation. Fuel saving is considerable.—Page 463.

Protect Your Thermocouples

Nickel-chrome protecting tubes will pay dividends by preventing breakdown of the pyrometer system when you need it most.—Page 464.

Quack Quenching Formulae

"If a canvass were taken . . . more quack formulae would come to light than would be considered possible . . . ," says heat treater.—Page 465.

Carburizing Errors

The most common error is to fail to allow sufficient time for the carburizing process to take place. From 6 to 8 hr. is required to give proper depth to case.—Page 465.

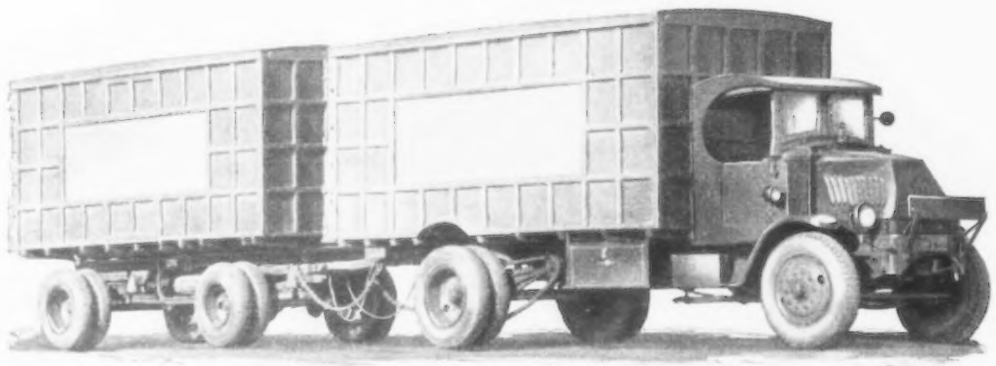
Roll Designing for Rustless Steel

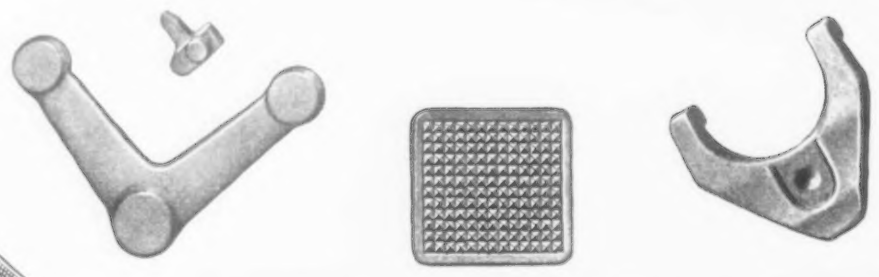
Passes designed for rolling shapes from common steels are likely to cause difficulty because the tendency to spread is different in the rustless type.—Page 467.

Welding Rustless Steels

The martensitic chrome steels may be welded with a rod of the same material but the seam must be heated afterward to avoid cracking.—Page 468.

MACK TRUCKS B BILLINGS FORGINGS





MACK TRUCKS Place a Load of Responsibility *on Billings Forgings*

MACK Model AC Bulldog Trucks personify strength, power, immense endurance. Every part, every forging must support these qualities and uphold Mack predominance in heavy-duty performance. Forgings by BILLINGS carry their load of responsibility for the Mack reputation. In our shops are scores of forging dies in which parts are shaped with accuracy and uniformity pre-requisite to flawless functioning of the truck mechanism. ★ Your engineers would like to inspect the new close-tolerance, *"semi-machined" finish* forgings which save substantially on machining costs. May we send you samples—or receive some from you for figuring out savings on the finished parts?

NEW YORK OFFICE: 55 WARREN STREET ★ CHICAGO, 565 WEST WASHINGTON BOULEVARD

RELY ON ME B THE BILLINGS & SPENCER Company—Hartford, Conn. B RELY ON ME

WDT